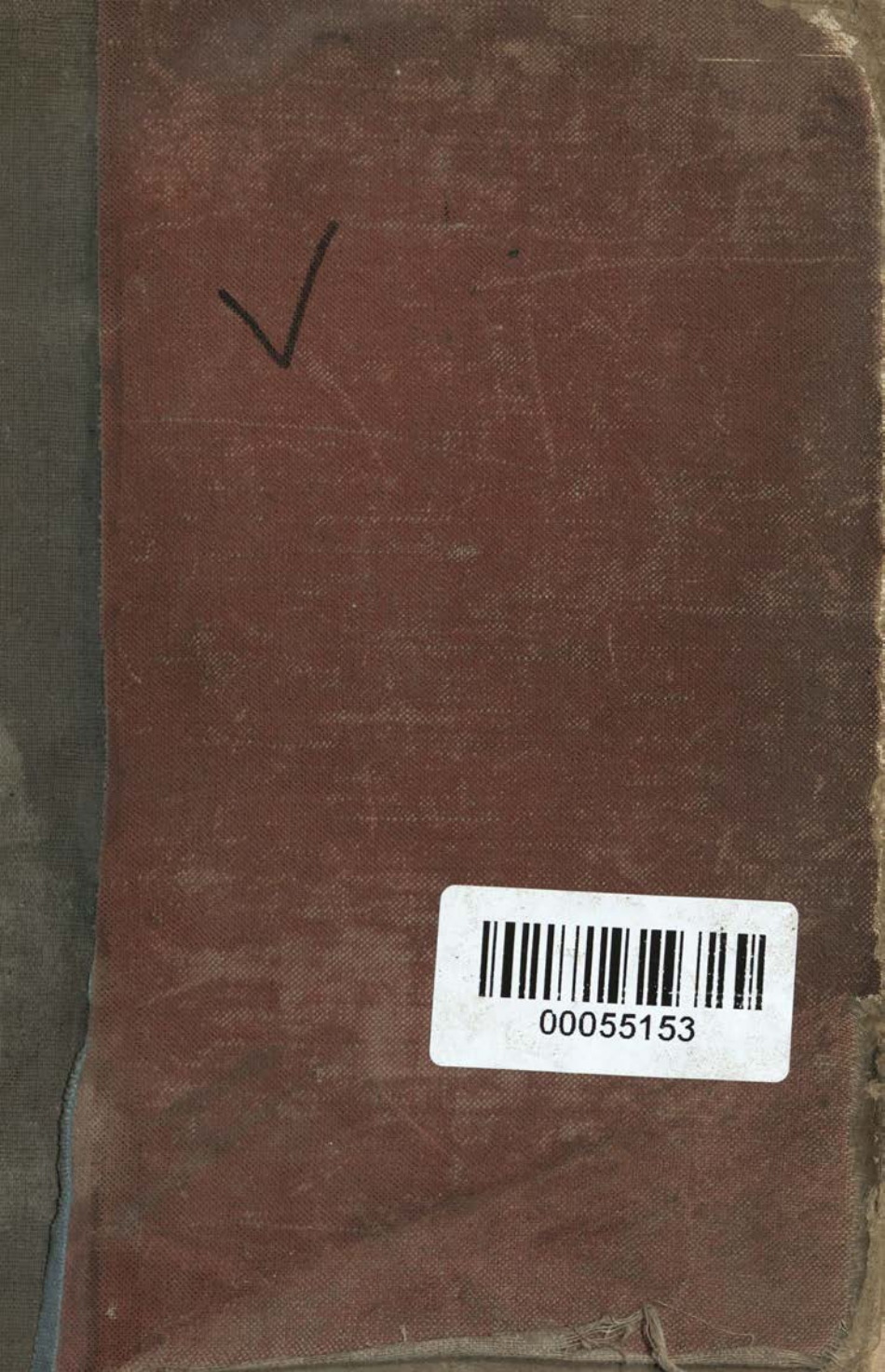
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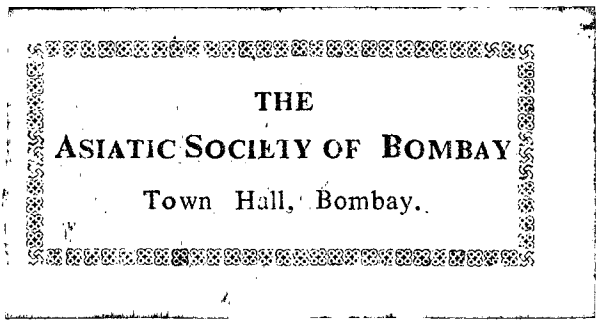

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SPECIES FILICUM.

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SPECIES FILICUM;

BEING DESCRIPTIONS OF THE KNOWN FERNS, PARTICULARLY OF SUCH AS EXIST IN THE AUTHOR'S HERBARIUM, OR ARE WITH SUFFICIENT ACCURACY DESCRIBED IN WORKS TO WHICH HE HAS HAD ACCESS;

ACCOMPANIED WITH NUMEROUS FIGURES:

BY

SIR WILLIAM JACKSON HOOKER, K.H., D.C.L.,

F.R.S., V.P.L.S., F.A.S., ETC.

DIRECTOR OF THE ROYAL BOTANIC GARDENS OF KEW.

55153

VOL. I.

CONTAINING

GLEICHENIA — DICTYOXYPHIUM.

PLATES I. — LXX.

LONDON:

WILLIAM PAMPLIN, 45, FRITH STREET, SOHO SQUARE.

M.DCCC.XLVI.

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TO

ROBERT BROWN, ESQ., D.C.L.,

MEMBER OF THE INSTITUTE,

VICE PRESIDENT OF THE LINNÆAN SOCIETY,

&c. &c. &c.

My Dear Sir,

Having enjoyed your friendship from the earliest period of my botanical career, and derived inestimable advantage from our frequent intercourse, as well personal as by letter, I trust I may be permitted to put that friendship, of which I have so much reason to be proud, on record, in the dedication of the present work, which is indebted to your writings and counsel, for much of what merit it may possess. Too happy am I in any opportunity of assuring you that

I am,

With most sincere regard and esteem,

Your faithful and affectionate,

W. J. HOOKER.

Kew, January 1, 1846.

PREFACE.

In submitting to the public a few short prefatory remarks upon the contents of the present volume, it has appeared to the author desirable to put his readers upon their guard at the outset, lest the notice on the wrappers of the several Nos. that the work might be expected "to comprehend all the known species of Ferns," should prove ultimately the cause of disappointment. He begs it therefore to be understood, that his meaning must be taken in the restricted sense of including only

1. Such as he himself has had the opportunity of examining in a perfect state, whether recent or dried.

2. Those which have been universally received, and which his own observations have tended to prove are justly to be regarded, as distinct, judging principally from figures; and

3. A considerable number, of which he has seen neither plates nor specimens, but which rest upon the authority of botanists, of so high a character, that it would be unwarrantable to dissent, without some specific cause, from their opinions.

Even thus, however, the difficulties he has had to encounter have been greater than would be easily imagined by any one who had not actually undertaken a task of the same kind. Nothing, he feels, could justify the conclusions at which he has arrived, respecting the union of many Genera and Species; but the power of examining the almost countless specimens, preserved either in his own peculiarly rich herbarium, or in the many others, as well public as private, to which he has been allowed access. The opportunities, thus afforded, of comparing the same species, in its varied forms, and from different, indeed often from widely severed, localities, have proved of the utmost utility. They have enabled him to arrive at results, to which no other means of investigation could have led. These results, he is aware, are but too likely to startle other students of the same tribe of plants; and indeed he is not ignorant that the so frequent junction of supposed distinct species, in the following pages, has already called forth expressions of surprize from the pens of able botanists. He needs, however, scarcely state, that such an amalgamation of supposed genera and species has never been made without the most careful investigation; and he must be allowed to add, that the further this investigation has proceeded, the more is he convinced that the system of curtailment ought to be, and will be, carried to a still greater length. There is, perhaps, no family of plants where more false species have been made, than among the

Ferns. This is owing to three causes. 1. The difficulty of accurately defining in words the highly varied forms of these beautiful plants. 2. The often imperfect or incomplete specimens collected, especially of the larger kinds. And 3. A too generally received opinion that the same Fern is not likely to grow in two very remote portions of the globe. In illustration of the last of these remarks, a more striking instance can hardly be adduced than the universally known *Osmunda regalis* of Linnæus, which, retaining its own name as an European species, has been described as *O. spectabilis* in North America, *O. speciosa* in Nepal, and *O. Leschenaultii* in the Neelgherries.

Innumerable examples of a similar kind might be brought forward, and nothing can assist in rectifying these errors but the opportunity of examining a large number of specimens from various habitats. The want of such opportunities has led botanists of high repute not uncommonly to commit mistakes; and the author will take the liberty of adducing one or two instances which have recently come before him; in fact, so recently, that it was only just as the concluding sheets of the present volume were in the press. He would not otherwise have failed to notice some of the errors before.

While engaged on the genus *Cystopteris*, he received the No. of Jacquemont's 'Voyage aux Indes Orientales,

Partie Botanique,' containing the Ferns. On examining it, to see if there were any individuals of the genus in question, he found three; viz., *Cystopteris retusa*, Decne., *C. dimidiata*, Decne., and *C. squamata*, Decne. The first two were, happily, accompanied with figures, from which, no less than from the excellent description, it was quite clear that *C. retusa* was identical with *C. fragilis* (an universally diffused species); while *C. dimidiata* is the *Davallia* (Leucostegia) *immersa* of this volume (p. 157). The *C. squamata*, of which there is no delineation, and only a brief distinguishing character, it was not in his power to identify, and it is accordingly here placed among the *Species dubiæ*, in the Addenda. Even its genus must remain doubtful; it may be (and standing next after *C. dimidiata* it probably is) a *Davallia* (Leucostegia, *Presl*), rather than a *Cystopteris*.

The appearance of the 'Hymenophyllaceæ' of Dr. Presl in England, exactly at the close of the printing of that group of Ferns in this work, has given rise to some remarks upon that publication at p. 144, which will show how widely at variance are the views, here propounded, respecting Genera and Species, with those held by that learned and indefatigable botanist. But scarcely had these two very dissimilar arrangements of the tribe in question come into circulation, than another appeared, from the pen of the excellent Dr. Klotzsch of Berlin; viz., 'The

Hymenophyllaceæ (and other Ferns of Equinoctial America', in which six "new species" are described. The first of these might have admitted of some doubt, as to its being really new, from the general nature of the specific character, no less than from its being referred to *Neurophyllum* of Presl; but the mention of Hostmann's Surinam plants removes every difficulty, and identifies the Fern in question with *Trichomanes floribundum* (H. B. K.) noticed at p. 129. Neither is it even a variety, like the remarkable var. β. (*l. c.*), which, in the absence of more materials at the time, had once been deemed distinct (the *T. Vittaria* of De Cand. and Hook. in Lond. Journ. of Bot. i. p. 137, t. 5).

These statements are made from no invidious motive, but simply to show that, without access to a most extensive collection of specimens, from widely different localities, the best botanists, as has already been remarked, must be liable to fall into mistakes of this kind, and therefore to multiply the difficulties of the study, by loading the system with dubious or wholly untenable species. It has become a necessary, but in many respects an ungrateful task, thus to confine the species, so far as practicable, within due bounds; but this is one main object the author has kept before him. His extensive herbarium has, however, necessarily presented many new forms; and these, and other hitherto unfigured ones, he has been anxious, wherever it could be done, to illustrate by faithful representations, executed on

as small and economical a scale as is compatible with accuracy. The delineations will often be useful to the student where words are not sufficiently intelligible.

It has been the aim of this publication, to give all the references to good figures that could be admitted, consistently with its limited nature; always preferring those which are the fullest and most accurate. Many that exist in the books of the older authors, as Sloane, Plukenet and even Plumier, are often purposely omitted (though quoted by other writers) as only tending to mislead. The fructification and venation were, at the time they wrote, too little regarded; and every botanist is now aware that, in a multitude of instances, some species of one genus resemble others of different genera, in almost every particular save this, the most important one.

There remains, what is no less the pleasure of the author than his duty, to acknowledge the much assistance derived from various botanists and travellers, in the services rendered to the present work, by their most liberal communication of specimens. Their names will be found recorded under the individual species. Hence, he trusts, it cannot be considered necessary to enumerate them in the present place, separately. To Dr. Wallich, however, he feels that something is due, beyond the bare mention of his name on such occasions. It was the disinterested liberality of that

highly distinguished naturalist which led, in the first instance, to the publication of the 'Icones Filicum' by the present author, in conjunction with Dr. Greville. Without the same rich materials for working upon, this Synopsis would never have been undertaken. It is not, however, for specimens alone that obligations are in this instance to be acknowledged. The same most kind friend still further communicated a copy of all his own and Dr. Roxburgh's valuable MSS. on the subject of Indian Ferns; which proved of eminent service, taken, as they were, in many cases, from entire fronds of the plants, which cannot be preserved in the herbarium. More than ordinary collections have also been received from the Royal Herbarium of Berlin, from the late Mr. Griffith, Mr. Gardner, Dr. Wight, Mrs. Genl. Walker, Rev. Mr. Colenso, Professor Wm. Jameson, H. Cadogan Rothery, Esq, &c. &c. &c.

The author's plates and descriptions of the 'Genera of Ferns,'* (genera constituted by the most distinguished Pteridologists), have been some time before the public. He there declined pledging himself to the adoption of these, or any particular portion of these, genera; on the ground that "a more accurate examination of the several species of each genus would probably enable

* 'Genera Filicum;' or Illustrations of the Genera of Ferns, chiefly from the coloured drawings of the late Francis Bauer, Esq.

him to form a more exact judgment on this head than was then in his power." Increased study has, he must confess, strengthened his conviction that those Botanists, who have showed themselves peculiarly addicted to multiplying genera, have not always taken Nature for their guide, nor succeeded in eliciting a simple and tangible arrangement. Yet have their close and accurate investigations thrown a new light upon the study of Ferns, a light which cannot fail to aid the researches of future writers, and which ought, therefore, to be gratefully acknowledged. In these remarks, Dr. Presl and Mr. John Smith are particularly alluded to. Dr. Presl was the first, at least in point of publication, to carry out the vast extension of the Genera, and his is the completest Catalogue that has yet appeared. In the following pages, a middle course has been pursued, between the highly multiplied genera of these two authors, and the too meagre enumerations of Willdenow, Sprengel, Link, Kunze, and others.

The author cannot conclude these observations without the expression of a most earnest wish, that our illustrious countryman, whose name stands in the Dedication of this work, had pursued to the fullest extent, those views, relating to the genera of Ferns, which have been, as far as they go, admirably detailed in the 'Plantæ Javanicæ Rariores,' p. 2, &c., and the 'Prodromus Floræ Novæ Hollandiæ.'

They are sufficient to show, that, had he given his master-mind to the complete development of the subject, little would have remained to his successor, but to tread closely in his steps.

SPECIES FILICUM

ORD. I.—FILICES.*

Capsules (Sporangia) sessile or pedicellate, free, rarely connate, one-celled, bursting variously, and various in texture, frequently surrounded by a more or less complete elastic *ring*, generally collected in definite clusters (*sori*), arising from veins on the under side of the leafy portion or frond, or at the margin, more rarely collected into spikes or racemes distinct from the frond, naked, or furnished with a peculiar membranaceous scale (*indusium, involucre*) which covers the sori wholly or in part; or, sometimes the margin is dilated into this membranaceous covering, and is interrupted or continuous. *Seeds* or *sporules* generally very small and numerous, varying in form.—Fronds *with circinate vernation, plane, herbaceous.* Trunk *or* root-stock *perennial, often creeping, frequently, in the tropics and in the southern hemisphere, arborescent.*

Ferns are found in almost every part of the globe where vascular vegetation exists at all; but they chiefly abound in moist and warm climates. They have a peculiar habit, by which they are more easily to be recognized than described, differing greatly from all other vegetables, generally exhibiting the most graceful forms, and varying in size from the humble *Trichomanes* or *Hymenophyllum* to the noble *Tree-Ferns* of the equatorial Forests.

SUBORD. I.—GLEICHENIACEÆ, *Br.*

Sori dorsal, naked, subglobose, formed of few, sessile, sometimes immersed *capsules*, which have a transverse or obliquely transverse, complete, elastic *ring*, bursting vertically (from the apex).—Tropical; *or* extra-tropical *only in the southern hemisphere, of a harsh and rigid texture, simple or, generally, with copious, dichotomous branches, and gemmæ in the axils; the ultimate branches pinnatifid.* HOOK. GEN. FIL. TAB. 39 AND 41, A. B. C.

* In this Order will be included *Osmundaceæ* and *Ophioglosseæ*. The work, indeed, is intended to include species of all the genera figured and described in the author's 'Genera Filicum,' published in one volume, with numerous coloured plates, many of the drawings of which were executed by the late Francis Bauer, Esq.

1. PLATYZOMA. *Br.*

Sori of very few (2—3) sessile *capsules* (mixed with a pulverulent substance, *Br.*), soon deciduous, placed at the apex of the simple veinlets, and concealed by the singularly revolute margins of the pinnæ. — Rootstock *creeping*. Fronds *cæspitose, glabrous, erect, unbranched, linear, pinnatifid*. Pinnæ *oval, sessile, very concave*. HOOK. GEN. FIL. TAB. 41. C.

1. P. *microphyllum*. *Br. Prodr. Nov. Hol. p.* 160. *Guillem. Ic. Pl. Austr. Rar. t.* 13. *Presl. tab.* 1. *f.* 4.

Hab. Tropical New Holland, *Mr. Brown*. Madagascar? *Bojer*.—This genus might perhaps, without violence to nature, be united to the following.

2. GLEICHENIA. *Br.*

Gleichenia, Calymella *and* Mertensia, *Presl*. Gleichenia *and* Mertensia, *J. Sm. and most authors*. Platyzomatis sp., *Desv*. Dicranopteris, *Bernh*. Sticherus, *Presl*.

Sori of few (2—4) sessile, superficial or immersed, deciduous *capsules*, situated on a lower exterior veinlet. — Tropical or Australasian Ferns, *procumbent, dichotomously branched: the branches simple or pinnate; pinnæ pinnatifid, the segments small, ovate or orbicular, or larger, oblong and linear, plane or concave, the margin sometimes singularly revolute, glabrous or chaffy*. Veins *pinnate, often immersed and obsolete, simple or forked*. HOOK. GEN. FIL. TAB. 41, A. B.; AND TAB. 39.

Subgen. I. EUGLEICHENIA. *Sori at the apex of a veinlet, capsules often sunk. Segments of the ultimate branches ovate or orbicular. Australasian or mountains of Java*. Gleichenia and Calymella, *Presl*.

1. G. *Speluncæ*, Br.; glabrous, fronds simple or forked and dichotomous pinnate, pinnæ pinnatifid the segments semiovate plane membranaceous glaucous beneath. (Tab. I. f. A.) —*Br. Prodr. p.* 160, (*not of Guillemin*).

Hab. Port Jackson, N. S. Wales, *Brown: Sieb. Syn. Fil. n.* 87: and Tasmania, *R. Gunn, Esq., n.* 34. — My specimens of this plant vary extremely in size and in the greater or less degree of ramification; yet they seem all to agree with Mr. Brown's essential character.

2. G. *rupestris*, Br.; glabrous, fronds forked or dichotomous, branches pinnate, pinnæ pinnatifid the segments rounded or obtusely subquadrangular coriaceous the margins thickened recurved glaucous beneath, capsules 3—4 exserted. (Tab. I. B.)

Hab. Port Jackson, N. S. Wales, *Brown, R. Cunningham*. — My only specimen of this has larger more obtuse segments of the pinnæ, and is of a much more coriaceous character, than the preceding.

3. G. *alpina*, Br.; fronds dichotomous proliferous, branches pinnate, pinnæ pinnatifid, segments orbicular fornicate be-

neath, the adult ones naked, younger ones and rachis densely clothed with ferruginous scales and down.—*Br. Prodr. p.* 161. *Hook. et Grev. Ic. Fil. t.* 58. Calymella, *Presl.*

Hab. Tasmania. Abundant on Mount Wellington, and on the western mountains, *Brown, R. Gunn, Esq.*—A small species, readily distinguished by its closely placed orbicular or semiglobose segments, the younger shoots densely clothed with rusty-coloured tomentum mixed with scales.

4. G. *polypodioides*, Sm.; fronds dichotomous, branches pinnate, pinnæ pinnatifid, segments ovate glaucous beneath, capsules 3—4 immersed forming a flat-topped sorus.—*Sm. Act. Taur.* v. *p.* 419, *and* ix. *f.* 10. *Schk. Fil. t.* 149.—*β.* fronds more glaucous beneath. G. glauca, *Sw.* (not *Mertensia glauca*, Sw.) G. gigantea, *Kaulf.*

Hab. S. Africa, probably chiefly on the mountains near the Cape Colony: at an elevation of from 1500 to 4500 feet, (*Drège, Eklon and Zeyher*).—The younger fronds, and especially the partial and main rachis, are frequently clothed with rusty down. The sorus is a beautiful object, sunk in a circular depression, which the three or four capsules exactly fill, depressed at the top, and marked from the centre with radiated lines, formed by the close proximity of the capsules and their bursting in the middle, from the centre to the circumference.

5. G. *microphylla*, Br.; fronds dichotomous divaricated, branches pinnate, pinnæ pinnatifid glabrous, segments ovate or subrotund nearly plane, their margins slightly recurved, capsules 3—4 exserted lax, branches and rachis clothed with ferruginous chaffy hairs.—*Br. Prodr. p.* 161. G. Speluncæ, *Guillem. Ic. Plant. Austr. Rar. t.* 12. G. circinata? *Sw.*

Hab. Port Jackson, *Brown.* Tasmania, *Brown, R. Gunn, Esq.*—If I do not mistake this plant, the segments of the leaves are ovate as well as subrotund, and it is distinguished from the following by the simply and slightly recurved margins of the segments, so that the sori are more exposed to view.

6. G. *dicarpa*, Br.; fronds dichotomous divaricated, branches pinnate, pinnæ pinnatifid, segments orbicular very fornicate with a broad recurved margin, capsules 2 within the hollow of the segment, branches nearly glabrous, rachis hairy. (Tab. I. C.)—*Br. Prodr. p.* 261. G. microphylla, *Sieb. Fl. Mixt. n.* 230.

Hab. Tasmania, *Brown, R. Gunn, Esq.*—This species is easily recognized by the orbicular and almost saccate form of the segments.

7. G. *semivestita*, Labill.; fronds dichotomous divaricated, branches pectinate, pinnæ pinnatifid, segments orbicular ovate slightly concave, branches densely ferrugineo-pubescent, rachis with few stellated hairs, capsules (3—4 exserted, *Labill.*) (Tab. II. A.)—*Labill. Sert. Nov. Caled. p.* 8, *t.* 11.

Hab. New Caledonia, *Labillardière.* Malacca, *Cuming.*—In many respects agreeing with some states of *G. microphylla*: and the slight differ-

ences may probably be due to the tropical or subtropical countries where alone this plant has been found.

8. G. *hecistophylla*, A. Cunn.; fronds dichotomous divaricated, branches pectinate, pinnæ pinnatifid, segments orbicular saccate, branches and rachis densely ferrugineo-pubescent, capsules 2 sunk in the hollow of the segments. (Tab. II. B.) —*A. Cunn. Nov. Zel. in Hook. Comp. to Bot. Mag. v.* ii. *p.* 361. G. semivestita, *J. Sm.* (*not Labill.*)

Hab. N. Zealand, *R. and A. Cunningham*, *Colenso*.—This seems to bear the same relation to *G. semivestita*, that *G. dicarpa* does to *G. microphylla*.

9. G. *longissima*, Bl.; "stipes dichotomous and the rachis flat above, fronds bipinnatifid submembranaceous glaucous beneath and slightly tomentose, pinnæ alternate linear-lanceolate deeply pinnatifid, the segments linear obtuse, capsules 3—4 subglobose sessile." *Bl. Fil. Jav. p.* 250.

Hab. Moist woods, Java, *Blume*.—This author says its place is between *G. polypodioides* and *G. microphylla*: and he notes two varieties. 1. fronds white beneath with the segments larger. 2. fronds coriaceous ferrugineo-tomentose beneath, the segments smaller, rachis with chaffy scales beneath.

10. G. *vulcanica*, Bl.; "stipes dichotomous tereté at length glabrous, fronds bifurcate bipinnatifid coriaceous glaucous beneath, pinnules narrow-linear, segments orbicular cucullate and reflexed beneath, rachis everywhere densely pubescent." *Bl. Fil. Jav. p.* 251.

Hab. Lofty burning mountains of Java and Celebes, *Blume*.—With this (as with the preceding) I am unacquainted. Mr. J. Smith refers it to *G. semivestita* in his 'Enum. Fil. Philipp.' but Blume notices its great affinity with *G. alpina*, and remarks that the common rachis is not tomentose, but altogether chaffy.

Subgen. II. MERTENSIA, *Willd. Sori near the middle or at the forking of the veinlets. Capsules sessile. Segments of the fronds linear or oblong, rarely ovate, larger than in the preceding group.* Mertensia, *Sw. and others.*

§ I. *Stipes forked, branches bipinnate.*

11. G. (*Mertensia*) *glauca*, Sw.; primary pinnæ opposite oblong acuminate, its rachis above with an acute margin, secondary lanceolate acuminate mostly alternate deeply pinnatifid, rachis flat without margin, segments linear oblong subacute very glaucous beneath obtuse and slightly serrated at the points glabrous or nearly so, capsules 3—5. (Tab. III. B.) — Mertensia glauca, *Sw. Syn. Fil. p.* 164 *and* 390 (*not* Gleichenia glauca, *Sw.*) G. Japonica, *Spr.* M. pinnata, *Kunze, Anal. Pterid. p.* 6.

Hab. Mountains, Japan (*Swartz*). Owhyhee, *Macrae*, *Nightingale*.—My specimen, the same as the *M. pinnata* of Kunze, seems to me to ac-

cord so well with the description of Swartz, that I have little hesitation in referring it to the *Mertensia glauca* of that author.

12. G. *gigantea*, Wall.; primary pinnæ opposite oblong acuminate, its rachis above with a slightly elevated very obtuse margin, secondary lanceolate acuminate alternate deeply pinnatifid, segments oval oblong very obtuse entire with an elevated crest at the base above forming an interrupted marginal line to the rachis which beneath as well as the costa is woolly scarcely glaucous, capsules 3—5. (Tab. III. A.)—*Wallich Cat. n.* 157.

Hab. Nepal, *Wallich.* Assam, *Mrs. Mack.* — Dr. Wallich has rightly judged this to be a distinct species. It is remarkable for the longitudinal crests at the base of the segments on the upper side. At the setting on of the primary pinnæ is a collection of leafy deeply laciniated persistent scales, which I presume included the gemma before its development, and which probably is found in all of the present section.

13. G. *Bancroftii*, Hook.; primary pinnæ opposite oblong acuminate, its rachis above with a very acute margin, secondary lanceolate alternate deeply pinnatifid almost pinnated, segments remote decurrent at the lower base linear obtuse entire perfectly glabrous rather glaucous beneath, at the base above slightly crested so as to form an interrupted margin to the rachis, capsules 3—4. (Tab. IV. A.)

Hab. Jamaica, *Swartz, Dr. Bancroft.*—This also seems specifically distinct from *G. glauca*, and is no doubt the fern without fructification which Dr. Swartz detected in Jamaica, and referred doubtfully to that plant. Perhaps the *Filix taxiformis minor* of Plum. Fil. t. 25, may be the same as this, although Swartz has placed it among his dubious *Aspidia.*

14. G. *excelsa*, J. Sm.; primary pinnæ opposite oblong acuminate, its rachis above with an acute elevated line, secondary alternate lanceolate acuminate deeply pinnatifid, segments linear-oblong obtuse glabrous slightly glaucous beneath, at the base above with an elevated crest forming a margin on each side the furrowed rachis, capsules 3—5. (Tab. IV. B.)—*J. Sm. Enum. Fil. Philipp. in Hook. Journ. of Bot.* iii. *p.* 420, (*without description*).

Hab. Luçon, *Cuming*, (*n.* 265). — Intermediate, as it were, between *G. Bancroftii* and *G. gigantea.*

Obs. All the species of this group are large ferns, 5—6 feet long, in the case of *G. gigantea*, according to Wallich, and probably in the others also, "forming impenetrable and extensive jungles." The caudex is very long and creeping; the stipes at first forked, the branches of the forks bearing doubly pinnate fronds, the ultimate pinnæ pinnatifid. The small portions we see in our herbaria have consequently little resemblance in structure to the following species; but the affinity would be more apparent if we saw entire specimens.

§ II. *Fronds dichotomous (rarely simple) pinnatifid: in other words the leafy portion is not confined to the forked apices, but is decurrent more or less upon the branched portion of the stipes.* (See Tab. VI.—VIII).

15. G. *flabellata*, Br; fronds two or three times dichotomous proliferous flabelliform, branches lanceolate ascending caudate at the point pinnatifid, below pinnate, segments linear acute serrated erecto-patent, capsules 1—4.—*Br. Prodr. p.* 161. *Labill. Sert. Nov. Caled. p.* 9, *t.* 12.

Hab. New Holland and Tasmania, *Brown*, *Gunn*, *Lawrence*. New Caledonia, *Labillardière*. Northern Island, N. Zealand, *A. Cunningham*, *Colenso*, *Dr. Sinclair*. — Fronds more or less harsh and rigid or soft and membranaceous; in the former case the margin of the segments is revolute, giving the latter a narrower appearance.

16. G. *tenera*, Br.; "fronds dichotomous proliferous, branches lanceolate pinnatifid, pinnæ (segments?) linear entire divaricated slightly hairy, rachis scaly, capsules 3—5 exserted sessile." *Br. Prodr. p.* 161.

Hab. Tasmania, *Brown*. — With this species I am unacquainted. It is probably allied to the preceding.

17. G. *Cunninghami*, Hew. MS.; stipes clothed with large deciduous scales, fronds dichotomous flabellate, branches lanceolate acuminate patent and falcato-recurved pinnatifid almost to the apex, below pinnate, segments rigid coriaceous linear acute quite entire beneath glaucous and clothed with copious deciduous hairs, capsules 2—4. (Tab. VI. B.)—G. arachnoidea, *A. Cunn. MS.*

Hab. Northern Island, N. Zealand, *A. Cunningham*, *Colenso*, *Edgerley*, *Dieffenbach*. — Certainly near *G. flabellata*, but very distinct. It is of an extremely rigid habit, the fronds are of a thick coriaceous texture, the apex of the branches not running out into a tail-like point, but pinnatifid to the extremity, patent and falcato-recurved, very glaucous beneath, the segments quite entire. I have seen specimens only from New Zealand.

18. G. *pedalis*, Kaulf.; stipes and rachis with deciduous chaffy scales, fronds dichotomous proliferous subflabelliform, branches linear-lanceolate acuminate divaricate falcato-recurved or reflexed pinnatifid, segments oblong broader at the base nearly horizontal glabrous, the margins slightly recurved, capsules 2—4. (Tab. VIII. B.)—*Kaulf. Enum. Fil. p.* 39.—*β.* frond glabrous beneath.

Hab. Chili, *Chamisso*, *Bertero*, *Poeppig* (var. *β.*). Valdivia, *Bridges* (*n.* 803). Guinea, *Richard* (according to Kaulfuss). — This is a small species about a foot high; whence I presume its specific name; of a harsh, rigid character, and of a singularly yellow hue when dry, as is the following. I have never seen specimens but from the Pacific side of South America, always from Chili, and chiefly from the south of that country. Probably Richard's species from Guinea, referred hither by Kaulfuss, is something very different.

19. G. *cryptocarpa*, Hook.; glabrous, fronds dichotomous proliferous subflabelliform, branches broadly lanceolate acuminate ascending or subincurved and falcate rigid pinnatifid, segments linear acute patent the margins recurved concealing the sori and almost meeting on the costa, capsules 1—4. (Tab. VI. A.)

Hab. Plains near Los Andes, Province of Valdivia (*n.* 802) and Chiloe (*n.* 20), *Bridges*. Falkland Islands, *Lieut. Robinson*. — The affinity of this is with *G. pedalis*, but the habit and the direction of the branches of the frond are different, and the revolution of the margin of the fertile segments is such as to conceal the fructification almost as in *Cryptogramma*. Bridges says it is from 1 to 3 feet high.

20. G. *acutifolia*, Hook.; stipes glabrous, fronds about twice dichotomous subflabelliform, branches broadly lanceolate acuminate somewhat falcate pinnatifid, segments linear acute somewhat hairy beneath clothed on the costa and midrib with ferruginous aristate scales, the margin recurved, capsules 2—4. (Tab. VIII. A.)

Hab. Port Antonio and Port Famine, Patagonia, *Capt. King's Voyage*.— This is a small species, scarcely a foot high. In each of my specimens from two localities the frond is only twice dichotomous, the branches or peduncles which bear the forks or pinnæ are short, and leafy chiefly on one side. The colour in the dry state is dingy brown, below ferruginous from the rusty scales on the rachis and costa.

Obs. The six preceding species might almost form a distinct group, having apparently an upright stipes terminated by more or less flabelliform fronds; and they do not seem to possess the straggling character of the remainder of the section.

21. G. *revoluta*, H. B. K.; stipes and rachis especially beneath clothed with ferruginous ciliated chaffy scales, fronds repeatedly dichotomous proliferous rigid coriaceous, branches linear acuminate pinnatifid, segments ovate horizontal obtuse glaucous beneath, the margins revolute, capsules 2—4. (Tab. VII. A.)—*Humb. et Kunth, Nov. Gen. Am. v.* i. *p.* 29. Mertensia angusta, *Klotzsch, in Herb. nostr.*

Hab. Andes of Quito. Cold and elevated situations at Saraguru of Parama and Pulla, between 9—10,000 feet above the level of the sea, *Humboldt, Jameson* (*n.* 40). — Stipes clothed with pale (bleached?) fimbriated scales. Under side of the fronds with ferruginous-brown ciliated scales, which, in the perfect specimens, conceal the fructification, and, almost entirely, the glaucous underside of the frond.

22. G. *simplex*, Hook.; stipes naked, frond simple linear rarely forked at the top acuminated and caudate at the point deeply pinnatifid pinnate at the base, rachis densely clothed beneath with pale ferruginous large fimbriated scales, segments and pinnules obliquely patent linear-oblong broader at the base obtuse entire very glaucous beneath, capsules 2—4.

Hook. Ic. Pl. v. i. *t.* 92. Mertensia simplex, *Desv. MS. in Dict. des Sc. Nat. with a figure.*

Hab. Andes of Quito, *Prof. W. Jameson* (*n.* 83), Cordillera of Peru, *Mathews* (*n.* 1093). — A simple-fronded fern, in the adult state, is certainly a phenomenon in the genus *Gleichenia*, and I have more than once, especially on finding a specimen proliferous at the apex, with circinate infant branches, been disposed to consider it a state of the preceding species; I can hardly say the infant state, because there is generally fructification in abundance. But on again directing attention to the subject, I am induced to keep them distinct: — for I find that copious specimens of both plants are very constant to their characters: and though I have received, at several different periods, from Professor Jameson, the respective plants, they are uniformly the same; and by my correspondent sending the two with different numbers, he appears not to entertain the shadow of a doubt of their being distinct. Of the present I may observe that I never find the stipes otherwise than free from chaffy scales: the scales on the rachis are of a much paler colour than in the preceding, the frond is broader, the segments longer and narrower, the lower ones often rather remotely separated from one another, the apex, when completely developed, caudate.

23. G. (*Mertensia*) *pubescens*, Willd.; stipes round glabrous or more or less chaffy, fronds repeatedly dichotomous leafy, branches or pinnæ lanceolate acuminate ascending pinnatifid, segments horizontal or nearly so linear obtuse or retuse, beneath clothed with a dense pale ferruginous cobwebby substance in which the sori are immersed, capsules 4–5.—Mertensia ferruginea, *Desv.*—M. immersa, *Kaulf.*—*Hook. et Grev. Ic. Fil. t.* 15. M. velata, *Kze.*— M. bifida, *Willd.*—β. *glabra*; fronds more or less glabrous beneath. M. furcata, *Sw.*— Acrostichum furcatum, *L.*—Polypodium, *Sw. Fl. Ind. Occ.*—*Plum. Fil. t.* 28.—γ. pinnæ or branches narrow.

Hab. Brazil and West Indian islands, frequent, Peru, *Pöppig* and *Herb. nostr.* Guatemala, *Mr. Skinner*, and Rio, *Mr. Gardner*, (larger and bright green in drying).—β. West Indies, *Swartz.* South Brazil, *Sellow*, *Tweedie.*—γ. Guiana, *Schomburgk*, *n.* 1039.—A very frequent fern in the tropical parts of the New World, and, as far as I know, confined to the New World; growing at various elevations and in various exposures, and consequently presenting different appearances. I cannot but think that the *Mertensia furcata*, Sw., is merely a glabrous or nearly glabrous variety of *G. pubescens*; but I prefer retaining the latter name as the more characteristic of the perfect state of the plant, which is remarkable for the cobwebby like wool which clothes the whole underside of the frond with a pale ferruginous substance. Martius indeed says, "it is distinguished from *M. furcata* and others by the more patulous branches, by denser and more persistent down, by fewer laciniæ less pectinatedly disposed and decurrent on one side the lower petioles or branches:"—but all these, as is evident from the very numerous specimens before me, are very variable characters. It seems to be a large species, and the copious dichotomies very leafy. — I regret that I have not the figure referred to by Willdenow for his *M. bifida*; Act. Holm. 1804, t. 5. f. B: a species taken up by all authors, but which from the description I should scarcely think different from *G. pubescens*, next to which it is placed.

24. G. *Mathewsii*, Hook.; small (1½ foot) stipes terete or nearly so glabrous, frond twice dichotomous partially leafy below the upper fork and chiefly on one side, branches lanceolate falcate pinnatifid, segments linear obtuse patent but pointing upwards subglaucous beneath and clothed with deciduous cobwebby down, rachis subpaleaceous, capsules 3—4. (Tab. VII. B.)—M. furcata, *Mart. et Galeot. Fil. Mex. p.* 17. —*β. major;* pinnæ larger.

Hab. Peru, *Mathews*. Savannas and marshes, Cordillera of Oaxaca, Mexico, at an elevation of 7500 feet above the level of the sea, *Galeotti*.—*β.* Dominica, *Dr. Imray*.—This may be a young state of *G. pubescens*, but the fructification is perfect. The fronds both in the Mexican and Peruvian specimens are small, including the stipes and the creeping caudex scarcely exceeding 1½ foot high: but I rest the chief distinction on the leafy portion extending so little way down from the apex: or, to make myself perhaps more intelligible, the frond itself is only twice forked, in which respect it differs greatly from the preceding species.

25. G. (*Mertensia*) *farinosa*, Kaulf.; "frond pinnate, gemmæ abortive, pinnæ (branches) petiolate geminate lanceolate deeply pinnatifid, segments linear obtuse beneath ochraceous-farinose, capsules 4, costa beneath and stipes paleaceous." *Kunze, Analect. Pterid. p.* 6, *t.* 3.

Hab. Trinidad, *Sieber*.—This plant is unknown to me except by Kunze's figure and description. I have placed it here from its great affinity with my *G. Mathewsii*. It is, indeed, owing to its proliferous propensity from the axil of the main dichotomy that it becomes, as characterized by Kunze, pinnate: so that the frond exactly corresponds with *M. Mathewsii:* and the only difference seems to be that the latter species has the under side clothed with deciduous cobwebby down, the present with an ochry farinaceous substance.

26. G. *Owhyhensis*, Hook.; upper part of the stipes much compressed and winged with 2 elevated ciliated lateral lines, frond 3 or 4 times dichotomous leafy, branches lanceolate acuminate incurved pinnatifid, rachis clothed principally at the margin with chaffy ciliated ferruginous hairs, segments linear horizontal broad at the base tapering towards the point acute loosely cobwebby on the costa and veins beneath, capsules 2—4.

Hab. Byron's Bay, Owhyhee, *Macrae*.—Allied, especially in the hairy rachis, to the following species, *G. longipinnata;* but the pinnæ, or ultimate branches, are much shorter and the segments on the lower forkings of the branches are as long as in the ultimate ones. It seems to be a large plant, the branches or pinnæ 2 inches to 2½ inches broad, changing to a dark rusty brown colour in drying.

27. G. *longipinnata*, Hook.; upper part of the stipes much compressed hispid at the margins, frond twice dichotomous, branches of the first fork very short with 3—4 pairs of unequal segments, branches or pinnæ of the upper fork 2—2½ feet

long falcato-incurved lanceolate acuminate deeply pectinato-pinnatifid, rachis clothed with ferruginous chaffy hairs, the segments linear horizontal obtuse or emarginate, the recurved margins and base beneath clothed with ferruginous hairs, sori abundant, capsules 2—3.

Hab. Surinam, *Dr. Hostmann, n.* 238.—My solitary specimen of this is confined to the upper portion of a stipes with a twice-forked frond: the lower fork or dichotomy is not an inch long, but the branches or pinnæ of the upper fork are between 2 and 3 feet long, copiously and beautifully pectinato-pinnatifid, 3 inches in diameter. It has perhaps the longest pinnæ of any known species.

28. G. *flagellaris*, Spreng.; stipes rounded "chaffy" (*Spr.*) at length smooth, fronds repeatedly dichotomous, branches elongato-lanceolate pinnatifid, segments linear-lanceolate obtuse very glaucous beneath and there at the base of the costa clothed with ferruginous wool. — Mertensia flagellaris, *Bory*. M. muricata, *Sieber*.

Hab. Mauritius, *Sieber, Syn. Fil. n.* 18, *et Fl. Mixt. n.* 277, *Mr. Telfair, Bory, Bojer.* — A distinct and well marked species, the narrow leafy fronds copiously dichotomous, the lower branches spreading, the under side singularly glaucous. None of my specimens possess fructification, although I have many of them.

29. G. (*Mertensia*) *lævigata*, Willd.; stipes rounded or nearly so with a marginal wing on each side, frond 3 or 4 times dichotomous leafy, branches spreading, ultimate ones or pinnæ lanceolate acuminate pinnatifid, segments linear obtuse or retuse glabrous or slightly cobwebby at the costa paler but not glaucous beneath, capsules about 4. — G. Javanica, *Spr.* Sticherus lævigatus, *Pr.*

Hab. Java (*Willd.*), *Chas. Millett, Esq.*—This comes near the preceding but is truly distinct, and has broader pinnæ and narrower segments. There is an evident narrow wing on each side the stipes.

30. G. *ferruginea*, Bl.; "stipes dichotomous rounded glabrous, branches above slightly channelled, fronds geminate lanceolate submembranaceous deeply pinnatifid beneath clothed with rusty down, segments linear rather obtuse, capsules about 6 globose sessile." *Bl. Fil. Jav. p.* 249, (*not* Mertensia ferruginea, *Desv.*)

Hab. Mountain woods, Java, *Blume.* — The author observes of this that it differs from *Gleichenia immersa*, Hook. & Grev. (*G. pubescens* of this work), in its semipinnatifid branches.

31. G. *vestita*, Bl.; "stipes dichotomous paleaceous plane above, fronds bifurcate deeply pinnatifid decurrent on the stipes coriaceous glaucous beneath, segments half-lanceolate obtuse the margin revolute, somewhat pubescent on the costa beneath, capsules 4—5 subglobose sessile, rachis densely chaffy beneath." *Bl. Fil. Jav. p.* 249.

Hab. Lofty mountains of Java, *Blume*.—"Appears to differ from *G. Javanica*, Spr. (*Mertensia lævigata*, Willd.) in the shorter and more obtuse segments of the frond, glaucous beneath." May not this be *G. flagellaris?*

32. G. *bifurcata*, Bl.; "stipes dichotomous subpaleaceous plane above, fronds bifurcate or dichotomous deeply pinnatifid even on the dichotomy (of the branches) of the stipes decurrent submembranaceous green beneath, segments linear obtuse or abrupt and emarginate downy on the costa beneath, rachis beneath sparingly paleaceous." *Bl. Fil. Jav. p.* 250. —*β.* plant everywhere quite glabrous. G. bifurcata, *J. Sm. Enum. Pl. Philipp. in Hook. Journ. of Bot. v.* iii. *p.* 420.

Hab. Java, on the mountain Burangrang, *Blume*.—*β.* Malacca, *Cuming, n.* 377. S. America, in the Caracas, *Linden, n.* 77.—It is extremely difficult, without authentic specimens or figures, to determine the exact species intended by authors of this genus. Mr. J. Smith may be correct in referring Cuming's plant (*n.* 377) from Malacca, hither: but as my specimens at least have not the slightest trace of down, I have ventured to make a variety of it, and even to consider a *Gleichenia* distributed in Linden's collections from Caracas to be the same. It differs from Cuming's specimens only in being larger, taken, it would appear, from a more vigorous plant.—Of the original species of Blume, that author observes that it differs from his *G. vestita* in the segments of the fronds not being decurrent upon the branches, in their being narrower, longer and of a thinner texture, and in the rachis being sparingly chaffy.

33. G. *hirta*, Bl.; "stipes dichotomous nearly round, branches slightly compressed, fronds dichotomous deeply pinnatifid even on the dichotomy (of the branchlets) half-decurrent coriaceous glaucous beneath, segments linear obtuse serrulate at the apex cobwebby and (sub)-tomentose at the costa beneath, rachis with chaffy hairs, capsules 3—5 subglobose sessile." *Bl. Fil. Jav. p.* 250.

Hab. Woody mountains of the Moluccas, *Blume*.

34. G. *rufinervis*, Mart.; "stipe rounded, frond repeatedly dichotomous glabrous beneath, petioles rounded apterous, segments from a broad base linear, the costa beneath clothed with rusty down, capsules (short pyriform) beneath the tomentum 6—8." *Mart. Crypt. Brazil.* p. 111.

Hab. Minas Geraes, Brazil, *Freireiss*, (*Mart.*)—The above is all the account that Martius has given of this plant.

§ III. *Stipes simple and bearing simply forked pinnæ (see* Tab. V. A.*); or dichotomous, the branches zigzag, bearing alternate branchlets each with simply forked, or only one pair of, pinnæ. Segments never decurrent.*

35. G. (*Mertensia*) *glaucescens*, Willd.; stipes terete, branchlets with a decurrent line below the frond each terminated by a pair of lanceolate pinnatifid pinnæ glabrous or nearly so glaucous beneath, segments linear entire obtuse emarginate,

capsules 8—10. — M. pectinata, *Willd.* — *Langsd. et Fisch. Ic. Fil. t.* 30. M. dichotoma, *Sw.* (*non Willd.*) M. Brasiliana, *Desv.* M. canescens, *Kaulf.* M. emarginata, *Raddi, Fil. Brasil, t.* 6. M. Hermanni, *Hook. et Grev. Ic. Fil. t.* 14 (*excluding the synonyms*). — β. pinnæ beneath clothed with ferruginous cobwebby down.

Hab. Frequent throughout Brazil and in S. America and the West Indies generally. Guatemala, *Skinner*. Mexico, *Galeotti*—β. Bahia, (*Herb. nostr.*)—I greatly erred in referring this to the *G. Hermanni* of Mr. Brown (*G. dichotoma*, Willd. and this work), from which it is at once distinguished by the absence of the pair of pinnules at the base of the forkings of the stipes. The character of the species is indeed very peculiar, and I do not know any with which it is likely to be confounded. It is, as other species are, liable to vary in the size of the pinnæ and in their relative length and breadth, and slightly in pubescence. The whole plant is so well marked that the species might with propriety form a section of itself: the following however may be considered a more simple form of the same section.

36. G. *nervosa*, Kaulf.; caudex creeping, stipes terete short simple bearing a frond consisting of one pair of broadly ovate acute pectinato-pinnatifid pinnæ, segments long linear narrow coriaceous acute nearly horizontal glossy and marked with prominent veins above, the margin revolute, glaucous beneath and densely clothed with rusty tomentum among which the capsules 3—4 in a sorus are imbedded. (Tab. V. A.)

Hab. Brazil. St. Catherine's, *Chamisso, Sellow, Capt. Beechey.*—A most distinct and well marked and beautiful species, and as far as I know only hitherto discovered at St. Catherine's of Brazil.

§ IV. *Stipes repeatedly di- or trichotomous, the ultimate branches bearing simply forked pinnæ: a pair of pinnæ also arise from the base of the di- or trichotomy of the branches* (*not of the frond*). *Segments never decurrent.*

37. G. (*Mertensia*) *dichotoma*, Willd.; stipes rounded, ultimate branches with a pair of pinnæ and a pair also at the base of the di-trichotomy, pinnæ lanceolate acuminate pinnatifid, segments linear obtuse or emarginate glaucous beneath glabrous or nearly so, lower external ones generally the largest often again pinnatifid, capsules 10—12.—*Schkuhr, Fil. t.* 148 (*excellent*). *Mart. Crypt. Brazil. p.* 111. *Langsd. et Fisch. Ic. Fil. t.* 29, (*excl. syn. of Swartz*). *Sieber, Syn. Fil. n.* 20. Mertensia discolor, *Schrad.—Mart.* M. Sieberi, *Presl.* Polypodium dichotomum, *Thunb. Jap. t.* 37. G. lanigera, *Don*, (*according to J. Sm.*) Sticherus laniger, *Presl.* G. Hermanni, *Br. Prodr. p.* 161 (*not of Hook. et Grev.*) Mertensia Hookeri, *J. Sm.—Rumph. Amboin.* 6, *p.* 38. M. flexuosa, *Mart. Crypt. Brazil, p.* 108, *t.* 60, *f.* 1. M. pusilla, *Mart. Crypt. Brazil, p.* 111, *t.* 60, *f.* 2. G. rigida, *J. Sm.*

Enum. Fil. Philipp. in Hook. Journ. of Bot. iv. *p.* 420. —*β.* pinnæ very broad, more or less caudate at the apex. M. mucronata, *Reinw. according to J. Sm. l. c. p.* 420. —*δ.* pinnæ very large, almost a span broad, some of the lower segments large and deeply pinnatifid others lobed or toothed.

Hab. East Indies and Malay Islands, frequent. Nepal, Sylhet, Tenesserim, Singapore, *Wallich.* China, *Beechey &c.* Ceylon, abundant, *Mrs. Col. Walker.* Malabar coast (with rigid fronds), *Dr. Wight.* Philippine Islands (fronds membranaceous), *n.* 270, *Cuming*, and *n.* 136 (fronds very rigid and segments broad, G. rigida, *J. Sm.*, our *var. β.*) Assam, with var. *γ. Mrs. Mack.* Pulo Penang, (*Hort. Soc.*) Mauritius, *Bouton.* Java, *Millett.* Anuhe, an island in the S. Pacific, *Nightingale.* Madagascar, *Dr. Lyall, Forbes, Bojer.* Fernando Po, *Vogel, (Niger Expedition).* Brazil, *Martius*, Diamond district, *Gardner, n.* 5337. Bahia, *Salzmann.* S. Brazil, *Tweedie, n.* 1119. Island of Taboga, near Panama (exactly Martius' *M. flexuosa*), *Barclay.* Trinidad, *Mr. Lockhart.*

I am literally overwhelmed with specimens of this plant from almost all the tropical parts of the world, and if the peculiar structure of the fronds be considered and allowance made for the usual variations, so general among ferns, it is an easily recognized species.

38. G. *Klotzschii*, Hook.; stipes rounded, ultimate branches with a pair of pinnæ and a pair also at the base of the dichotomy, pinnæ elongato-lanceolate acuminate pinnatifid, segments linear acute coriaceous glabrous glaucous beneath where the costa is clothed with long ferruginous hairs, lower external segments the smallest quite entire, capsules 4—6. (Tab. V. B.)—Mertensia revoluta, *Klotzsch, MS. in Herb. Reg. Berol. et in Herb. nostr. (not H.B.K.)*

Hab. Brazil, *Sellow.*—Perhaps this ought rather to be considered a variety of the preceding than retained as a distinct species. My specimen is but imperfect; but it evidently belongs to this section. The pinnæ are about a foot long, rigid, coriaceous. The chief character of the species, if species it may be called, lies in the copious long dark ferruginous hairs which clothe the rachis of the segments beneath.

Dubious Species.

39. G. *tenuis*, Presl; "affinis videtur G. glaucescenti, *Humb.*" 40. G. *nitida*, Presl; "affinis G. dichotomæ." 41. Mertensia *remota*, Kaulf.; "frond dichotomous branched, primary gemma proliferous, pinnæ geminate elongate linear-lanceolate and as well as the branches pinnate, pinnules linear glaucous beneath, sori minute." Hab. Brazil, *Kaulf.* 42. M. *tomentosa*, Sw.; probably the same with G. pubescens. 43. M. *fulva*, Desv. 44. M. *elata*, Desv. 45. M. *truncata*, Willd.; "stipes dichotomous naked, fronds pinnate, pinnæ glabrous of the same colour beneath truncate at the apex, decurrent on the stipes through all the dichotomies," *Willd. Act. Holm.* 1804, *p.* 169, *t.* 5, *f.* A. 46. M. *Cuming-*

iana, Presl.—There is a M. *Magellanica* quoted by Desvaux as described by Poiret in Encycl. Bot. Suppl. 3, p. 669; but on referring to that work there is no such species mentioned.

Subord. II.—POLYPODIACEÆ, *Br.*

Sori dorsal, often near, or at, the margin, various in form, sometimes constituting an uniform linear or spreading mass, naked or furnished with an involucre. *Capsules* one-celled, with a longitudinal or oblique elastic articulated generally incomplete *ring*, bursting transversely and irregularly.—*A most extensive* suborder, *but of which, as it appears to me, all the groups or tribes are so connected together by habit and structure, as to form in themselves one natural division, not affording subdivisions of equal value with* Gleicheniaceæ *for example. They inhabit almost every part of the world from the tropics to the arctic and antarctic regions where extreme cold prevails, and are exceedingly variable in size and appearance, including as the suborder does, the largest Tree-Ferns, and the smallest herbaceous species.*

Tribe I. CYATHEÆ, *Gaud.*

Sori globose, situated upon, or at the forking of, a vein. *Capsules* numerous, sessile or stalked, upon an elevated receptacle, often mixed with hairs, obovate more or less compressed, furnished with a broad, generally oblique, frequently complete elastic *ring*. *Involucre* sometimes covering the whole sorus, having its origin from beneath and bursting irregularly or with a circular opening, frequently cup-shaped, entire or more or less lobed or laciniated, sometimes wholly wanting.—Arborescent Ferns *inhabiting tropical or subtropical countries.* Trunk *or* caudex *attaining a height of* 40—50 *feet in many instances.*

1. Cyathea, *Sm.*

Polypodii sp. *of Auth.* Sphæropteris, *Bernh.* (not *Wall.*). Schizocœna, *J. Sm.* Disphenia, *Presl.*

Sori globose, situated upon a vein or veinlet, or in the axil of a fork of the vein. *Receptacle* elevated, globose or columnar. *Involucre* globose, inferior, membranaceous or somewhat horny, at first entire and covering the whole sorus, afterwards bursting from the top with a nearly circular opening, becoming cup-shaped, more or less entire or laciniated or lobed. *Veins* pinnate, simple or forked, free.—Arborescent, *the* trunk *often beautifully marked with the scars of fallen fronds.* Fronds *simple, or usually pinnate or decom-*

poundly pinnate. Stipes *frequently aculeated.* HOOK. GEN. FIL. TAB. 2 AND 23.

Subgen. I. NOTOCARPIA, *Presl.* *Sori situated upon a vein or veinlet, not at the forking.* Schizocœna, *J. Sm.* HOOK. GEN. FIL. TAB. 2.

1. C. *sinuata*, Hook. et Grev.; fronds simple lanceolate very much elongated sinuated at the margin.—*Hook. et Grev. Ic. Fil. t.* 106.

Hab. Ceylon, *Dr. Emerson*, *Mrs. Col. Walker.* — The caudex of this is about an inch in diameter, clothed with the dark brown almost black bases of the stipites of the old fronds, bearing a crown of elegant simple long wavy fronds at the top. These have a stout costa. The veins are pinnated and the veinlets bear the sori near the middle. Involucre globose or slightly depressed, bursting very irregularly at the top, so as to become cup-shaped with a very uneven margin. Receptacle globose. Capsules on long stalks.

2. C. *Brunonis*, Wall.; fronds pinnate, pinnæ oblongo-lanceolate acuminated with a long narrow point sinuato-crenate often serrated at the margin above.—*Wall. Cat. n.* 179. *Hook. Gen. Fil. t.* 2. C. longifolia, *Wall. in Herb.* 1823.

Hab. Pulo Penang, *Dr. Wallich, Lady Dalhousie.* Malacca, *Cuming. n.* 378.—This is a truly beautiful fern, but of which the caudex is unknown to me, nor is it described in Dr. Wallich's MS. volumes of ferns, which I owe to that gentleman's liberality. The stipes is one or two feet long; the frond 2—3 feet, alternately pinnated: pinnæ 6—8 inches long, between membranous and coriaceous, obliquely truncated at the base and shortly petiolate, tapering into a narrow acumen at the point. Sori copious, from the middle of the forked veins or veinlets. Involucre of the same structure as the preceding, but in age more lacerated and lobed. Capsules stalked.

3. C. *Mexicana*, Schlecht.; unarmed, rachis and costa above pubescenti-scabrous, fronds bipinnate, pinnules lanceolate acuminate pinnatifid glabrous, segments oblong slightly falcate rather obtuse serrated, sori confined to the lower half of the segment, situated upon the veins which are almost wholly simple or below the fork when divided very rarely indeed at the forking, involucre exceedingly thin and fragile almost resembling a thin coat of varnish when perfect soon obliterated.—*Schlecht. in Linnæa. v.* v, *p.* 616. *Presl. Tent. Pterid. t.* 1, *f.* 8 (*very accurate as to the situation of the sori*). *Martens et Galeot. Fil. Mex. p.* 79 (*where read n.* 6335 *instead of* 6334). *Galeotti Herb. Mex. n.* 6335 (*not Hook. in Benth. Pl. Hartweg. p.* 54, *n.* 412).

Hab. River-sides, forests of Xalapa, Mexico, *Schiede et Deppe. Galeotti.*—This remarkable fern seems to have been found only at or near Xalapa. It is remarkable in having the habit of the species of the following sub-genus, but bearing the sori almost always on simple veins, or below the forking in the rare instances of their being divided, sometimes but very

seldom at the forking, and it shows how careful we ought to be in not laying too much stress on the value of the venation and position of the sori, in distinguishing genera of ferns. Galeotti speaks of it as inhabiting, along with *Alsophila pruinata*, the borders of brooks in the thick forests of Xalapa and Totutla, at an elevation above the sea of 3500 to 4000 feet.

Doubtful Species of this Section.

4. ? C. *lævigata*, Willd. *Herb.*; "fronds bipinnate, pinnules sessile linear-lanceolate subcordate at the base crenate at the apex, stipes smooth, rachis tomentose, sori subcostal." *Kaulf. Enum. Fil. p.* 256.—C. Madagascarensis, *Kaulf. l. c. p.* 257 (*according to Presl*).

Hab. Madagascar, *Petit Thouars.*—"Pinnules an inch long, three lines wide, glabrous; veins bi-trifurcate." Of this and the two following I know nothing from authentic specimens. Presl places them in his section of NEUROCARPIA; but the subcostal sori described by Kaulfuss in this and the next species, and especially the remark on the present one, "Sori placed on the division of the veins," would lead to a different conclusion.

5. ? C. *marattioides*, Willd. *Herb.*; "fronds bipinnate (?), pinnules petiolate lanceolate acuminate cordate at the base serrated at the apex, rachis hairy above, sori subcostal subcontiguous." *Kaulf. Enum. Fil. p.* 256.

Hab. Madagascar, *Petit Thouars.*—"Lower pinnules an inch long, upper gradually larger, 2 inches long ½ an inch wide. Veins bi-trifurcate."

C. *grandifolia*, Willd. and C. *speciosa*, Willd. will be found under *Hemitelia*.

Subgen. II. EUCYATHEA. *Sori in the axils of the forks.* HOOK. GEN. FIL. TAB. 23.

OBS. Perhaps in the whole range of the great family of Ferns there is not a group more difficult of accurate determination than are the species of this section of *Cyathea*. They have arborescent trunks, whose appearance and even external form are only known to travellers who have the privilege of seeing them in their native soils. The fronds, gigantic in most cases, and large in all, seldom reach us in an entire state. We are but little acquainted with the stipes, whether it be unarmed or aculeated, or with any other character which may afford marks of distinction. The shape or outline of the entire frond we have rarely the means of ascertaining: nor do we know what is the exact nature of its composition, nor the value to be put upon the more or less downy or scaly covering of the pinnæ, or the greater or less breadth of the pinnæ or pinnules or segments, or the more or less deeply serrated margins. Hence too the synonymy becomes inextricable; and without the opportunity of examining authentic specimens of authors, their species in many instances must be looked upon as doubtful. The difficulty is increased by the older authors not considering the nature of the fructification, nor the venation, so that in few herbaria do we find the most common and we presume the original species, the one upon which the genus appears to have been mainly founded, *C. arborea* (Plum. Fil. t. 2), correctly named. The attempt here made to determine the species must be considered as very imperfect; but the best I can offer, derived from a very extensive pri-

vate collection, and from works where they have been the most carefully described.

* *Species of the West Indies, Mexico and South America.*

6. C. *arborea*, Sm.; unarmed or with few distant short prickles on the main rachis and stipes which are frequently downy, fronds bipinnate, pinnules lanceolate elongate much acuminated deeply pinnatifid glabrous or with the rachis and costa hairy paler beneath, involucre coriaceous cup-shaped in age a little contracted upwards opening with a beautifully even margin. — *α. nigrescens;* rigid, stipes rachis and upper side of the frond almost black when dry, involucres chartaceous nearly black. Polypodium arboreum, *L.—Plum. Fil. t.* 1 (*reduced figure of the entire plant*), *and t.* 2.—Disphenia arborea, *Presl.*—C. Guadelupensis, *Spr.* (*according to Presl*). C. bisulca (C. affinis *in text*), *Schkh. Fil. t.* 132, *b, and* 132, *c, according to Kaulf.* — *β. pallida;* less rigid, stipes rachis and upper side of the frond paler, involucre membranaceous brown. C. elegans, *Hew. in Mag. of Nat. Hist.* 1838, *p.* 466. *Hook. Gen. Fil. t.* 23.

Hab. Jamaica, Hispaniola, Martinique, St. Vincent's, and probably the West-Indian Islands generally. Ilhios, Brazil (*Moricand in Herb. nostr. under the name of* C. Sternbergii).—In consequence of the imperfect figures and descriptions of the early authors, it cannot be clearly ascertained what they meant by their *Polypodium arboreum.* Yet Plumier's representation of the involucres is so characteristic that I think I cannot do wrong in considering our present plant to be the same: and that this is the *Cyathea arborea* of Sir J. E. Smith, I have the authority of a specimen from himself which cannot be mistaken. The essential character, as it appears to me, is to be looked for in the firm texture and beautifully regular margin of the cup-shaped involucre in age, in my *var. β.*, indeed, becoming thinner and consequently somewhat more fragile, yet still different from that of any other species with which I am acquainted, and especially in the depth of the cup and its remaining so perfect and regular in form, after the capsules have fallen away. Occasionally the receptacle has been seen to be bifid, and then this plant becomes *Disphenia* of Presl.

7. C. *Serra*, Willd.; more or less muricated, fronds bipinnate, pinnules lanceolate deeply pinnatifid much acuminated, segments linear-oblong acute serrated falcate glabrous or the costa and rachis slightly hairy, sori generally covering the whole of the segments, involucre very thin and membranaceous at length forming a shallow hemispherical cup entire or more or less torn at the margin. (Tab. IX. A.) C. Guadelupensis, *Spr. in Nov. Act. Acad. Nat. Cur.* 1821, *p.* 233. Hemitelia Serra, *Desv.*

Hab. Caracas, *Bredemeyer* (*in Willd.*) Jamaica, *Dr. Bancroft.* St. Vincent, *Rev. L. Guilding.* Guadeloupe, *C. S. Parker, Esq.* Serra de Batatho, Brazil, *Gardner, n.* 2990. — I am aware that Sprengel unites the *C. Serra*, and even his own *C. Guadelupensis*, to *C. arborea.* I find, however,

the present plant, which I consider distinct from *arborea*, so entirely to agree with Willdenow's description, that I do not hesitate to figure and describe it as such. The sori are very different from those of *C. arborea*, always pale brown (as indeed the whole plant is, when dry) even in perfection; the upper half of the involucre has rather the appearance of a coat of varnish than of a firm membrane, and this breaks away or disappears with the capsules, and only a very thin and shallow fragile cup remains at the base, as shown in our figure. The stipes and rachis are never dark-coloured, which is frequently the case in *C. arborea*.

8. C. *Imrayana*, Hook.; slightly aculeate, stipes more or less clothed with ferruginous down, general and partial rachis especially beneath hispid with laciniated scales, fronds bipinnate, pinnules lanceolate acuminate serrate pinnatifid, segments oblong or linear subfalcate generally nearly entire, sori covering most of the segments, involucre globose membranaceous fragile bursting very irregularly. (Tab. IX. B.)—*β. subnudata;* main rachis with the scales deciduous.

Hab. Couliaban Mountain, Dominica, *Dr. Imray*. Jamaica, *Dr. Bancroft*.—*β.* Jamaica, *Wiles*, *Bancroft*.—This indeed, like the preceding, varies in the length and breadth of the pinnæ and segments: and the scaly covering of the rachis, though remarkable in some specimens, is scarcely visible upon that of others, from its deciduous character, as may be supposed. The involucre is very fragile, and, when burst, extremely irregular, thin and membranaceous, never opening with the thin even margin of *C. arborea*.

9. C. *muricata*, Willd.; "fronds bipinnate, pinnules oblong-lanceolate acuminate pinnatifid, segments oblong obtuse crenate, rachis and arboreous caudex aculeated." *Willd. Sp. Pl. v.* iv. *p.* 497, (*not of Sieber*). *Kaulf. Enum. Fil. p.* 259? "*Plum. Fil. p.* 5, *t.* 4."

Hab. Martinique, *Plumier*.—I know nothing of this. Willdenow seems to have taken it up solely from the figure of Plumier, which has no fructification; thus even the genus must be doubtful. Kaulfuss quotes Sieber's *C. muricata* as the plant of Willdenow. This may be; but if so it is an *Alsophila* and not a true *Cyathea*.

10. C. *aspera*, Sw.; "stem arboreous aculeated, fronds subbipinnate, pinnules coadunate oblong obtuse serrated at the apex." *Sw. Syn. Fil. p.* 139. Polypodium asperum *Linn.*—*Plum. Fil. t.* 3.—*Not* Alsophila aspera, *Hook. et Grev. Ic. Fil. t.* 213—215?

Hab. Jamaica, *Swartz*. Hispaniola, *Plumier*.—This, like the former, is to me a very dubious species. Dr. Greville and myself had hesitatingly referred it to our *Alsophila aspera* above quoted. But Kaulfuss and Presl retain it in *Cyathea*, and the former adds to its character "receptaculo bivalvi," as in the *Disphenia* of Presl. Plumier's figure seems to be the original authority for the plant, which is not sufficiently characteristic of any species I am acquainted with.

11. C. *aculeata*, Willd. Herb.; "arborescent aculeated at the base, frond bipinnate, leaflets subcoadunate lanceolato-

falcate obtuse serrated hairy beneath at the costa and the partial rachis, sori biserial mostly at the base of the segment, receptacle globose" ("at length bipartite," *Presl*). *Spreng. Syst. Veg. p.* 126. *Kaulf. Enum. Fil. p.* 255. Disphenia aculeata, *Presl, Tent. Pterid. p.* 55, *t.* 1, *f.* 13.

Hab. Hispaniola. Portorico, (*Spreng.*)—It is impossible, without an inspection of Willdenow's herbarium, to determine Sprengel's plant. Presl's figure of the leaflets is very like *C. arborea:* but the receptacle and involucre are such as I have never seen (the former deeply bipartite, larger than, and exserted much beyond, the firm and even edge of the involucre) and certainly do not correspond with Kaulfuss' remark, which would appear to be made on Willdenow's specimen. He says "it differs from *C. arborea* in the rachis and pinnules being hairy beneath, that the receptacle is globose, and the involucres very thin and caducous."

12. C. *cuspidata*, Kze.; "frond bipinnate, pinnules alternate subsessile divergent oblong cuspidate unequal at the base deeply pinnatifid beneath with minute white" (deciduous) "scales, segments linear-falcate the lower fertile portion contracted crenulate at the apex and acute, sori costal, partial rachis furrowed above paleaceo-hirsute" (at length glabrous) "shining beneath, universal rachis rough above shining beneath, stipes hairy at the base." (Tab. XII. A.) *Kze. Syn. Pl. Crypt. Pœpp. p.* 101. *Mart. Ic. Pl. Crypt. Braz. p.* 78.

Hab. Marshy woods of Maynas, Peru, *Pœppig.*—The figure here given is taken from one of Pœppig's own specimens. It is assuredly allied to *C. arborea*, as Kunze remarks, but especially to some of the varieties with narrow elongated segments; yet the involucre seems different, very thin and membranaceous, bursting irregularly and not forming a cup beneath the sorus. Martius compares it to *C. excelsa*, a Mauritius species with a very different habit.

13. C. *divergens*, Kze.; "frond bipinnate pendulous, pinnæ alternate petiolate very remote, pinnules alternate much petiolated divergenti-divaricate lanceolate acuminate deeply pinnatifid, the segments oblong falcate acute serrated on the reflexed margin, sori costal numerous contiguous, rachis hairy above scabrous beneath, stipes chaffy above aculeated beneath." (Tab. XI. A.) *Kze. Syn. Pl. Crypt. Pœpp. p.* 100. *Mart. Ic. Pl. Crypt. Braz. p.* 78.

Hab. Mountains of Pampayaco, Peru, *Pœppig.* — Kunze makes no remarks on the affinities of this species. Martius alludes to its resemblance to *C. arborea;* but to me it appears to be very distinct in the size and form of the segments and in the very petiolated pinnules, as may be seen by our figure taken from an original specimen.

14. C. *equestris*, Kze.; "fronds bipinnate, pinnules remote alternate petiolate the lower ones divaricated lanceolate acuminate equal at the base pinnatifid, the segments oblongo-falcate obtuse serrated at the apex, the lower ones fertile, sori

subcostal irregular, costa and partial rachis hairy and rough above glabrous beneath." *Kze. l. c. p.* 100.

Hab. Mountains near Pampayaco, Cerro de Cristobal, Peru, *Pœppig.*— This is only taken up by Kunze, who speaks of it as very different from any previously described species.

15. C. *vestita*, Mart.; "frond bipinnate, stipes and rachis shortly and acutely aculeated, partial rachis and nerves with rusty hairs, pinnules pubescenti-villous beneath linear-acuminate deeply pinnatifid, the segments falcato-lanceolate rather acute crenulate with 6—10 sori in each." *Mart. l. c. p.* 75, *t.* 52.

Hab. Brazil. Woods of the Province of St. Sebastian and St. Paul, *Martius.* Serra dos Piloes, *Pohl.* Serra de Araripe, *Gardner*, *n.* 1907.— Martius compares this with *C. aculeata*, Willd. and Kaulf., but observes that it is different, especially in the more acuminated segments. Mr. Gardner's plant above quoted, which agrees with this, has a caudex 20—30 feet high, and an involucre very thin, membranaceous and brittle.

16. C. *hirtula*, Mart.; "frond bipinnate, stipes sharply aculeate and the rachis with brownish hairs and sparingly paleaceous, pinnules on each side slightly pubescenti-hirsute linear acute pinnatifid, the segments ovato-lanceolate rather obtuse subcrenulate or entire, sori in each segment few situated at the base." *Mart. l. c. p.* 76, *t.* 53.

Hab. Serro do Mar, Province of Bahia, Brazil, *Prince de Neuwied.*— Martius notices the affinity of this to his *C. Grevilleana* (*Ic. Pl. Bras. p.* 78) from Jamaica, but the latter "differs in the larger and more sparingly pubescent fronds, in the rachis and nerves not patenti-hirsute but strigillose in the acuminated pinnules, in the lower segments being distinct, and in the more numerous sori."

17. C. *Schanschin*, Mart.; "frond bipinnate, stipes and rachis sharply aculeated and with the rachis and nerves strigoso-villous, pinnules downy linear cuspidato-acuminate pinnatifid, segments linear-oblong obliquely rotundate subcrenulate, sori 6—10 in each segment." *Mart. l. c. p.* 77, *t.* 54. C. oligocarpa, *Kze. in Herb. Pœpp., and in Syn. Pl. Crypt. Pœpp. p.* 101. C. Mexicana, *Hook. in Benth. Pl. Hartweg. p.* 54. C. Mexicanæ affinis, *Martens et Galeotti, Fil. Mex. p.* 80. Alsophila fulva, *Martens et Galeotti, Fil. Mex. p.* 78, *t.* 23, (*sori inaccurate*).

Hab. Throughout a great portion of Brazil, perhaps universal in that country, especially in the provinces of St. Paul and Minas, *Martius, Sellow, Gardner* (Organ Mountains, *n.* 5955). Peru, *Hœnke, Pœppig, Mathews* (Casapi). Mexico, *Galeotti* (Cordillera of Oaxaca, *n.* 6347, *sori not burst, and n.* 6346), *Hartweg*, (Zacualtipan).—I possess named specimens of *C. Schanschin* from the Royal Berlin herbarium, gathered by Sellow; and from Pœppig of his *C. oligocarpa*, showing that the two are identical. It seems a widely extended species, not possessing indeed any very peculiar

characters; but we can happily refer to published species and an excellent figure for a proof of the plant here intended. Martius, who says it is called *Schanschin* or *Xanxin* in South Brazil, observes that "it differs from *C. vestita* in its clothing (indumentum), in the stipes and rachis being aculeated, and in the form of the pinnules and segments; and from *C. hirtula* in its larger size, stouter aculei, absence of hairiness and form of the pinnules, which are not acute but much and long-acuminated."—Kunze, however, compares the species with *C. aculeata*, Willd. Herb. and Kaulf., and with *C. arborea*, Sm. The latter, he says, "is recognized by its linear segments, serrated throughout the whole margin and acute, the costa with white chaffy scales at the base and the receptacle bipartite: the former by its narrower and more obtuse pinnæ, linear segments with the whole margin serrated, and the aculeated stipes."

18. C. *Gardneri*, Hook.; frond bipinnate, stipes and main rachis nearly glabrous, pinnules gradually and at the apex much acuminated pinnatifid, segments oblong obtuse falcate serrated hairy beneath especially on the costa and nerves, lowest ones adnato-decurrent, sori covering the whole segment, involucre almost globose pale brown opaque with a dark mammillate point at the apex at length bursting with a small aperture at the top. (TAB. X. B.)

Hab. Near Arrial das Merces, Brazil, *n.* 5328, and Morro Velho, *n.* 5333, *Gardner*.—This is a rather soft and flaccid species, more easily recognizable by the eye than described in words. The sori are very copious on the segments; the involucre opaque, firm, not readily bursting, but, while entire, tipped with a dark-coloured umbo.

19. C. *Beyrichiana*, Pr.; stipes aculeate, frond bipinnate, rachis and costa more or less downy, pinnules lanceolate acuminate, segments linear-oblong acute subserrate slightly falcate, sori copious, involucre apparently bursting vertically on the upper side large loose membranaceous persistent at length hemispherical. *Presl, Tent. Pterid. p.* 55 (*name only*). *Hook. Ic. Pl. v.* vii. *tab.* 623. Alsophila stipulacea, "*Beyrich, Herb.*"

Hab. Brazil, *Sellow*, *Beyrich*. Rio Janeiro, *Gardner*, *n.* 135.—My first knowledge of this plant was derived from a fine specimen sent to me by Dr. Klotzsch from the Royal Berlin herbarium; and it is very remarkable in the large persistent involucres, not bursting at the top all round, but dehiscing as it were vertically from the top outwards, towards the apex, or more correctly, obliquely towards the margin of the segments. The stipes is pale brown, minutely tubercled and also aculeated, at the base clothed with long brown chaffy hairs. The frond is dark green above, much paler beneath, in texture between membranaceous and coriaceous. Mr. Gardner's plant seems to be exactly the same, his specimen is a little more advanced in age, and of a yellower tint; but the structure of the involucres is similar, and may perhaps be considered as more analogous to that of *Hemitelia*, but it is difficult to decide without an examination of young fruit. In the earliest state of the sorus which has come under my observation, the involucre covers it entirely, but the point of attachment appears to be only on the lower half of the sorus next the costa. *C. Walkeræ* from Ceylon has a similar structure in its involucres, (see *n.* 33).

20. C. *Grevilleana*, Mart.; "frond bipinnated, rachis and nerves above strigillose, beneath the nerves and nervules minutely chaffy and slightly hairy, pinnules linear-lanceolate acuminate sessile deeply pinnatifid, segments linear or sub-lanceolate nearly straight acute crenulate, sori in the lower part of the segments 4—10." *Mart. l. c. p.* 78.

Hab. Jamaica, (*Greville*).—As a Jamaica plant, and communicated, which it is, by Dr. Greville to Martius, I ought to be acquainted with it; but brief specific characters, without figures or full diagnoses, will not suffice for distinguishing the species of *Cyathea* or allied genera, and thus the catalogue of dubious species must be large. Martius does indeed observe of this that it resembles *C. canaliculata* (a Mauritius species very unlike any Jamaica one that I have seen), but that this latter "may be known from it by its (larger) and more acuminated pinnæ, the segments almost entire, the sori crowded on all the segments,"—and that *C. Schanschin* differs in "the stipes, rachis and laminæ beneath being downy with true hairs, in the segments being more curved and more obtuse, in the lower ones of each pinnule being coherent, which in *C. Grevilleana* are altogether distinct." *

Dubious Species of the West Indies, Mexico and South America.

21. C. *Delgadii*, Pohl; Brazil.

22. C. *Sternbergii*, Pohl; Brazil.—This and the preceding appear to be noticed and perhaps described in Sternberg's '*Flora Orbis Primig.*' but, if so, I have no access to the work.

23. C. *Tussacii*, Desv.; "partial fronds triplicato-pinnate, pinnules adnate linear falcate obtuse entire, sori on each side somewhat solitary at the base of the pinnules, rachis chaffy, caudex arboreous." *Desv. Soc. Linn. Par. v.* ii. *p.* 323. Jamaica, *De Tussac.* "Affinis *C. glaucæ*, sed discolor nec glauca." *C. glauca*, it may be remarked, is a Mauritius species, and I have always observed there is little similarity between the *Cyatheæ* of the eastern and western world. Probably the present is a pale variety of *C. arborea.*

24. C. *polypodioides*, "Sw."; "herbaceous, frond bipinnate glabrous on both sides, leaves lanceolato-falcate acuminate, leaflets oblong acute serrated, sori solitary on each side at the costa." *Spr. Syst. Veg. v.* iv. *p.* 126.—Brazil. I do not find this species in Swartz.

25. C. *Woodwardioides*, Kaulf.; "fronds bipinnate, pinnules adnate oblongo-lanceolate obtuse obsoletely crenate at the apex, costa hairy beneath, rachis rough above with hairs, partial chaffy beneath, sori costal contiguous." *Kaulf. Enum. Fil. p.* 255. Hab. ——?

* Dr. Greville informs me he has reason to believe that the description of *C. Grevilleana*, here quoted, was drawn up by Martius from a specimen of our *Alsophila aspera.*—*Ic. Fil. t.* 213—5.

26. C. *Sellowiana*, Pr. All that I can find mentioned of this by Presl, is, that it is identical with "*C. aculeata*, Herb. Reg. Berol. Bras. n. 88."—Brazil.

** *Species of South Africa.*

27. C. *Drègei*, Kze.; unarmed, fronds bipinnate coriaceous, pinnules lanceolate acuminate pinnatifid glabrous above paler below, and rufo-tomentose on and near the rachis beneath, segments oblong-ovate subfalcate obtuse nearly entire, sori on the lower half of the segment immersed in rufous wool, involucre fragile forming an hemispherical cup, then breaking away irregularly. (TAB. X. B.) *Kze. in Linnæa, v.* xiii. *p.* 153, *et in v.* x. *p.* 551.—*β.* paler, segments serrated the wool beneath tawny, main rachis woolly. (TAB. XVII. A.)

Hab. S. Africa; rocky valley at the great cataract between Omsamwuho and Omsamcaba, *Drège*. Macalisberg, S. lat. 26°, *Burke*.—This has a caudex only 3—4 feet high, according to Drège. It has dark-coloured fronds when dry, paler beneath, a reddish stipes and rachis and very rufous wool, in which the sori are immersed: the rest glabrous. Drège has the credit of first discovering a true *Cyathea* in Africa. The same species, and also the following, were detected by Mr. Burke, while collecting for Lord Derby.

28. C. *Burkei*, Hook.; stipes tubercled with small aculei, and at its base and that of the main rachis clothed with glossy brown chaffy scales, frond bipinnatifid membranaceous, pinnules lanceolate obtusely acuminate bipinnatifid scarcely paler beneath, rachis partially woolly, glabrous above, segments oblong-ovate obtuse scarcely falcate entire, the costa hairy at the base, sori few often solitary, involucre globose remaining until much advanced, with an irregular opening at the top. (TAB. XVII. B.)

Hab. Macalisberg, S. Africa, *Burke*.—This has a dark mahogany-colored stipes and main rachis, clothed with short obtuse points or aculei, and with conspicuous glossy chaffy scales at the base of the main rachis and stipes,—membranaceous, dark-coloured fronds scarcely at all paler beneath, and much fewer and less woolly hairs among the sori than the preceding; still, future observations may prove that this is but a state of *C. Drègei*, and that only one species of the genus has yet been discovered in Africa.

*** *Species of Eastern India and Islands, the Pacific Islands and New Zealand.*

29. C. *canaliculata*, Willd. Herb.; unarmed or indistinctly tubercled, fronds bipinnate coriaceous, pinnules (large) broadly lanceolate acuminate deeply pinnatifid frequently again pinnated especially below glabrous (main rachis channelled when dry) articulated on the stipes, segments or ultimate pinnules linear-oblong obtuse more or less serrated, veins copi-

ous frequently twice or even thrice forked, sori occupying most of the segment at some distance from the costa, involucre membranaceous durable but bursting very irregularly. (Tab. XI. B.) *Spr. Syst. Veg. v.* iv. *p.* 126. C. Borbonica, *Poir.* C. Mascarena, *Sw. Mag. Nat. Berl.* 1811, *n.* 328 (*according to Desvaux*).—*β.* rachis very dark-colored. C. melanocaula, *Desv.*—*γ. latifolia*; pinnules a foot long, 3 inches broad, pinnated almost to the summit. (Tab. XIII. A).

Hab. Isles of France and Bourbon (*Poiret*), *Bojer*, *Sieber* (*Syn. Fil. n.* 59, *and Fl. Mixta n.* 305). Madagascar, *Desvaux.*—*γ.* Mauritius, *Bojer*, *Sieber* (*Fl. Mixta* n. 304).—A very distinct species, of which Prof. Bojer says that the caudex is much shorter than in the following (*C. excelsa*), and the frond far broader and thicker. It is the finest of the genus with which I am acquainted; the pinnules being 8—10 inches long and 2½ inches broad in the usual state of the plant; but some are more than a foot long and 4 inches broad, as in our var. *γ*. Sometimes the stipes and rachis become black, probably the effect of age, and then it is the *C. melanocaula*, Desv.

30. C. *excelsa*, Sw.; unarmed, fronds bipinnate rather membranaceous but firm, pinnules glabrous lanceolate much acuminated pinnatifid pinnate at the base, segments oblong, obliquely subacute serrated destitute of scales, veins simply forked below the middle, sori near the costa, involucre membranaceous glossy very fragile bursting irregularly often into lobes rarely bifid. (Tab. XII. B.)—*Sw. Syn. Fil. p.* 140 *and p.* 367. *Pr. Tent. Pterid. tab.* 1. *f.* 15. C. arborea, *Bory*, (*not Sm.*)

Hab. Bourbon, *Bory*, *Carmichael.* Mauritius, *Bojer.*—Stipes and rachis pale. Fronds, when dry, rather dark green, not verging to brown. Nerves very slender, but little prominent, once forked below the middle, and the sori are by no means so near the costa as in the following very distinct species. Swartz doubts, however, if this be really distinct from *C. medullaris.*

31. C. *Walkeræ*, Hook.; unarmed, fronds bipinnate, pinnules thick firm very coriaceous, deeply pinnatifid pinnate below, segments and ultimate pinnules (the latter contracted at the base) oblong very obtuse, entire or slightly crenate often scaly (scales deciduous) on the costa beneath, veins copious sunk forked at the very base often again about half way up, sori occupying the lowest fork close to, almost upon, the costa, involucres large opaque bursting as it were on the superior side only reflexed upon the costa and partially covering the sorus in the form of a broad bifid hood. *Hook. Ic. Pl. v.* vii. *t.* 647.

Hab. Adam's Peak, Ceylon, *Mrs. Col. Walker.*—An extremely well-marked species, of which I have received copious specimens from Mrs. Walker, and from that lady alone. The stipes and main rachis are of a mahogany colour, much flattened and slightly grooved when dry above, and

below naked or furnished with small concave deciduous scales. Pinnules as it were jointed upon the rachis and at the base pinnated, the segments or pinnules being distinct, contracted at the base so that their form is elliptical. The texture is very firm, rigid, coriaceous; when dry inclining to a rich brown colour, paler beneath. The veins are numerous, sunk, forked from the very base, and the sori being wholly confined to the axil of the lower fork are consequently placed close to the costa. Involucres membranous, but firm and opaque, bursting as it would appear rather irregularly on the superior half vertically, so as to be irregularly two-lobed: this large and broad involucre is then reflexed upon the costa, but still covering in a measure the sorus on the lower side in the form of a broad concave hood. As my specimens have all very advanced fruit, I cannot say with certainty that the involucre completely surrounds the sorus in the young state; but the probability is that it does, and that in structure it is analogous to that of *C. Beyrichiana*. I do not look upon it as a dimidiate involucre, or I should place it in *Hemitelia*.

32. C. *spinulosa*, Wall.; stipes and lower part of the rachis much and strongly aculeated, fronds bipinnate flaccid and membranaceous, pinnules sessile lanceolate acuminate pinnatifid, segments oblong acute serrulate glabrous with a few minute scattered deciduous scales sometimes on the costa beneath (especially on the barren frond), sori close to the costa copious, involucres globose membranaceous fragile glossy soon breaking down into a jagged irregular cup. (Tab. XIV. C.) *Wall. in Herb.* 1823. *Cat. n.* 178.

Hab. Nepal, *Wallich*. Madras Peninsula, *Dr. Wight*, *n.* 149. — This species is nearly allied to *C. excelsa*, but is of a more membranaceous texture, and the stipes and main rachis are closely and strongly muricated.

33. C. *glauca*, Bory; "fronds triplicato-pinnate, pinnules glaucous beneath oblong obtuse entire the lower ones dentate from the base to the middle, sori solitary at the base of the pinnules, rachis tomentose, stem arboreous." *Willd. Sp. Pl. v.* v. *p.* 493.

Hab. Bourbon, *Bory de St. Vincent*. — This species I have never seen, but it seems to be known to Willdenow and Kaulfuss. The former says that the secondary pinnæ are 2 inches and more long, and that the glaucous hue of the underside is due to a covering of excessively minute scales, only visible under a microscope. Kaulfuss states that the rachis is paleaceo-tomentose, and that the sori at the base of pinnules are generally 2 rarely 3 together.

34. C. *crenulata*, Bl.; "arboreous unarmed, fronds bipinnate (or tripinnatifid) coriaceous, pinnules lanceolate acuminate deeply pinnatifid chaffy at the costa beneath, segments linear-falcate crenulate at the margins obtuse and entire at the apex, sori (3—8) subconfluent close to the costa, rachis above tawny-tomentose nearly glabrous and rough with minute dots beneath." *Blume, Enum. Pl. Jav. Fil. p.* 244.

Hab. Moist mountain woods, Java, *Blume*. "*Cyathea canaliculata* differs in the segments only being toothed at the apex."

35. C. *Javanica*, Bl.; "arboreous unarmed, fronds bipinnate subcoriaceous, pinnules lanceolate acuminate deeply pinnatifid bullato-squamulose at the base of the costa, segments linear-subfalcate obtuse crenulate or entire plane, sori 2—5 parallel to the costa, secondary rachis paleaceo-tomentose, primary one asperulous with minute bristles." *Bl. l. c. p.* 245.—β. *rigida*: frond more rigid, sori (2—8) regularly arranged. *Bl. l. c.*

Hab. Woods on the mountains of Java, *Blume*.—"From *C. affinis*, Sw. this differs in the substance of the frond, in the plane segments and color of the stipes. It varies with the rachis tomentose or glabrous above."

36. C.? *Celebica*, Bl.; "fronds tripinnate coriaceous glauco-sericeous beneath, pinnules linear-lanceolate acuminate, secondary pinnules linear-subfalcate rather obtuse crenulate at the apex, truncate and sessile at the base, common rachis furfuraceous sparingly and slightly aculeated." *Bl. l. c. p.* 245.

Hab. Woods of the Islands of Celebes and Ternate, *Blume*.

37. C. *integra*, J. Sm.; unarmed, fronds bi-tripinnate, pinnules broad-lanceolate acuminated pinnatifid rather more than half way to the rachis, segments broadly ovate acute slightly serrated glabrous, sori mostly below the incisions at a considerable distance from the costa, involucres membranaceous at first hemispherical very thin and evanescent at the apex at length breaking into 4 or 5 rather regular spreading lobes. *Hook. Ic. Pl. v.* 7. *t.* 638. *J. Sm. En. Fil. Philipp. in Hook. Journ. of Bot. v.* iii. *p.* 419 (*name only*). — β. *petiolata*; pinnules mostly petiolated. *Hook. Ic. Pl. v.* 7, *t.* 638, *f.* 2. C. petiolata, *J. Sm. l. c. p.* 419.

Hab. Amboyna (Herb. Hook. from *P. B. Webb, Esq.*) Luçon, *Cuming*, *n.* 120. β. Isle of Mindora, Philippine Islands, *Cuming*, *n.* 359.—Mr. J. Smith also observes that he has our var. β. from New Ireland and from Jamaica; but the latter is probably an error, the plant having been given to him by Mr. Lambert as a supposed native of Jamaica.—A well marked species, but apparently not described by any author. The pinnules are less deeply divided than in any species of the genus I am acquainted with, and might almost be said to be lobed rather than pinnatifid; so that much of the fructification is placed below the sinus, between it and the costa, and all the sori are remote from the costa, as the forking of the nerves is at a distance from it.

38. C. *medullaris*, Sw.; stipes muricated with dark glandular hard tubercles, fronds bi-tripinnate coriaceous, pinnules glabrous sessile broad-lanceolate acuminate deeply pinnatifid with several small pale ciliated concave scales beneath, segments linear or linear-oblong obtuse, more or less crenate or serrated or subpinnatifid especially the fertile ones rarely entire, lowermost ones next the rachis sometimes quite pinnati-

fid, sori copious almost as broad as the narrow space between the costa and margin occupying a lobe or tooth which when dry has the margins very revolute, involucres globose membranaceous glossy soon breaking down into 3 or 4 irregular lobes.—*Schkuhr, Fil. f.* 138, (*good*). Polypodium medullare, *Forst.* Sphæropteris medullaris, *Bernh. in Schrad. Journ.* 1800, II, *p.* 122, *t.* 1. C. affinis, *Sw. Syn. Fil. p.* 141, (*not of Schkuhr, Fil. t.* 132, *b, and* 131, *d—h*). Polyp. affine, *Forst.* C. extensa, *Sw. Schkuhr, Fil. t.* 132, *a—c*, (good, as representing the barren state and the ciliated scales). Alsophila extensa, *Desv.—β. integra;* segments nearly entire.—*γ. tripinnata;* pinnules again pinnated except at the apex, pinnules quite entire. C. Mertensiana, *Bongard, MS. in Herb. Imp. Acad. Petersb. et in Herb. nostr.* Alsophila extensa, *Hook. et Arn. in Bot. of Beech. Voy. p.* 76.

Hab. New Zealand (where it is called "Mamagu"), probably confined to the northern island, *Forster and others.* Norfolk Island, *Forster in Endlicher.* Pacific Islands, *Forster.* New Guinea, *Barclay.* Otaheite, *Duperrey's Voy.*—β. New Zealand, *Colenso.*—γ. Bonin, *Dr. Mertens.* Coral islands, *Capt. Beechey.*—This is probably a more extensively diffused species than botanists are generally aware, and by no means confined to New Zealand, where however it forms a common article of food with the natives. 'Hæc filicis species" says Forster, "in sylvis Novæ Zelandiæ frequens est; et apud incolas *Mamagu* dicitur; hi radicem et caudicis inferioris medullam costam comedunt; hujus enim substantiæ mollis et pulposæ sapor quandam similitudinem cum rapæ sapore habet et quidem hinc præstat ita ut ad medullam *Saguari arboris* (*sago*) accedat. In medullari substantia hujus Polypodii succus glutinosus rubescens abundat." Like other *Cyatheaceæ*, the fronds are very variable in the form and margin of the segments. The stipes and rachis are remarkable for the glandular, glossy, raised points, resembling a resinous exudation dried and hardened the instant it had pierced the epidermis. I quite think the *Cyathea affinis* and *C. extensa*, gathered by Forster in the Pacific Isles, may be safely referred to this species, especially if, as I presume, the figures of Schkuhr which I have quoted here, are to be relied on, and more particularly if the fruit may be trusted as belonging to it: but *that*, on account of the bifid receptacle (a character probably by no means confined to one species), Kaulfuss has quoted under *C. arborea.* That fruit has the true cup of *Cyathea.* Mr. Brown, however, refers *C. extensa* to *Alsophila*, in which he is followed by Presl. Bory, in the 'Botany of Belanger's Voyage,' gives *C. extensa* as an inhabitant of high mountains of Java.

39. C. *dealbata*, Sw.; unarmed, frond bipinnate, rachis everywhere clothed with ferruginous deciduous down, pinnules narrow lanceolate acuminate deeply pinnatifid very glaucous beneath, sometimes again pinnate at the base, segments oblong acute falcate serrated, sori copious situated half way between the costa and margin, involucres globose membranaceous fragile soon breaking down in a very irregular

manner, the base above often remaining a shallow cup. *Rich. Fl. Nov. Zel. p.* 77, *t.* 10.

Hab. New Zealand. Northern and middle islands, *Forster and others. Poghna* of the natives.—This, so far as I know, is wholly confined to New Zealand, and is a very beautiful fern, rising with a caudex or trunk 10—15 feet high, crowned with a noble tuft of fronds white with glaucous farina beneath. Mr. Edgerley remarks that this fern is also eaten by the natives, and probably in the same way as the *C. medullaris.*

Dubious species of the East Indies.

40. C. *Rumphii*, Desv. Polypodium arboreum, *Lour. Fl. Cochin. excl. syn. Linn. Rumph. Amb. v.* ii. *p.* 64, *t.* 27, *Desv.*

2. HEMITELIA, *Br.* (*excl.* H. Capensis).

Cnemidaria, *Pr.* Cyatheæ sp. *of Auth.*

Sori solitary, globose, situated below the apex of a lateral vein or veinlet, generally near the margin. *Receptacle* elevated, globose or columnar. *Involucres* small, semicircular, concave, occupying the lower side of the sorus, at first applied to it, and at length reflexed and persistent, rarely forming a shallow cup under the sorus, and then small, indistinct, never at any period covering the whole sorus. *Veins* pinnated, simple or branched, generally forked, all free, or the lowest ones anastomosing.—*Natives of the tropics.* Arborescent. Fronds *large pinnate or decompound.* Pinnules *mostly larger and broader than in true* Cyatheæ. HOOK. GEN. FIL. TAB. 4, (veining imperfect, correctly represented in the accompanying figures).

OBS. If we take the *Hemitelia horrida* of Br. as our guide for the essential character of this genus, we shall have in it and *H. speciosa* and *obtusa*, and *grandifolia*, or even in *petiolata* and *Hostmanni*, not only a sufficiently natural, but well defined genus, characterized by the small dimidiate involucre closely pressed to the early formed sorus and distinctly visible: but there are other forms of inferior involucre, quite distinct from that of *Cyathea* and yet not harmonizing with *Hemitelia*, which I have still thought it better to bring hither than to unite with *Cyathea*, or, even less with *Alsophila.* These are *H. alternans*, *H. Guianensis*, and *H. Parkeri*, doubtfully referred by me to this genus.

* *Fronds pinnate.*

1. H. *speciosa*, Kaulf.; unarmed, fronds pinnate, pinnæ very long ensiform acuminate on a short petiole, obtuse at the base, the margin crenato-lobate, sori nearly marginal occupying the whole length of the pinnæ, veinlets all free. (TAB. XIII. B.)—Cyathea speciosa, *H.B.K. Nov. Gen. Am. v.* i. *p.* 20, *and Willd. Pr.* (*not* Cnemidaria speciosa, *Pr.*)

Hab. Caripe, *Humboldt.* Caracas, *Linden, n.* 79. Para, Brazil, *Martius.*—This is a truly beautiful species; and assuredly if there be any mean-

ing in words, the description of Kaulfuss, as well as of Willdenow, applies to this, although Presl refers the plants of these respective authors to two different genera: — that of Willdenow (and Humboldt) to true *Cyathea*, and that of Kaulfuss to his *Cnemidaria speciosa*. It is clear to me however from his figure of *Cnemidaria speciosa* that he had in view what I here consider the *Hemitelia obtusa* of Kaulfuss; a species which more nearly approaches the *H. grandifolia*, if indeed it be really distinct.

2. H.? *alternans*, Hook.; unarmed or only with extremely minute distant tubercles on the base of the stipes, fronds only (?) pinnate, pinnæ very remote petiolate alternate oblong lanceolate membranaceo-coriaceous acuminated deeply pinnatifid almost to the rachis, at the base again pinnated, segments and pinnules oblong rounded at the apex with rather an acute point nearly entire, veins all free forked near the base rarely simple, sori on the veinlets above the fork (seldom in the axil) copious forming a series half-way between the margin and the costa, involucre a very shallow cup or little pellicular peltate scale covered and concealed by the sorus. *Hook. Ic. Pl. v.* 7, *t.* 622. Polypodium alternans, *Wall. Cat. n.* 329.

Hab. Penang, *Dr. Wallich*, 1822, *Lady Dalhousie*. — This is one of the many Cyatheaceous plants whose genus will probably long be considered doubtful. The habit sufficiently harmonizes with the species of this genus: but the involucre is not dimidiate, but peltate and nearly flat, going all round the base of the sorus, though small and distinct and wholly covered and concealed by the sorus itself. As far as I can judge from my specimens the fronds are only once pinnated, in this respect resembling the first section, with very remote pinnæ, which are nearly a foot long, and, only below, again pinnated, the rest deeply pinnatifid. Veins quite free (never anastomosing).

3. H. *obtusa*, Kaulf.; aculeated, fronds pinnate, pinnæ broad-lanceolate acuminate pinnatifid or lobed half-way down to the rachis, lobes approximate so as to leave a very narrow sinus, broadly oval obtuse subfalcate serrulate, sori at a little distance from the margin and forming a continued line much below the sinus so as to approach the rachis, veins generally once or twice forked the lower ones angularly anastomosing and sending out veinlets which meet or almost meet at the sinus. (Tab. XIV. A.) *Kaulf. En. Fil. p.* 252. *Presl.* Cnemidaria speciosa; *Presl, Tent. Pterid. p.* 57, *t.* 1, *f.* 16, 17, (*sori inaccurate*). Hemitelia speciosa, *Mart. l. c. p.* 66 (*in obs.*), *t.* 48, *f.* 2, (*not Kaulf.*)

Hab. West-Indian islands, probably generally. Jamaica, *Wiles*. Trinidad, *Baron de Schack*, *Lockhart*. St. Vincent, *Rev. L. Guilding*. British Guiana, *C. S. Parker, Esq*, French-Guiana, (*Delessert*). — Lower part of the stipes aculeated with short, rather obtuse prickles. Under side of the fronds with deciduous bullate whitish scattered scales upon the costa and nerves.

4. H. *grandifolia*, Spr.; aculeated, fronds pinnated, pinnæ large lanceolate acuminated pinnatifid more than two thirds of the way down from the margin, lobes or segments oval-oblong rather acute not closely approximate but leaving a deep and moderate sinus subfalcate serrulate principally towards the apex, sori at a little distance from the margin and forming a continued line below the sinus reaching almost to the costa, veins once or twice forked the lower ones angularly anastomosing and sending out veinlets which almost meet at the sinus. (TAB. XIV. B.) *Plum. Fil. t.* 26. Cyathea grandifolia, *Willd. Presl.* C. horrida, *Sieb. Fl. Mixta, n.* 331, *and Fl. Mart. n.* 375, (*not Sm.*) Cnemidaria Kohautiana, *Pr.*

Hab. Martinique, *Plumier*. Trinidad, Jamaica, St. Vincent, and probably the West-Indian islands generally. — Allied to the preceding, and the two may possibly pass into each other. If so the name of *grandifolia* should be retained. My specimens however seem tolerably constant. The stipes is aculeated and the underside of the frond has frequently the same deciduous scales as in *H. obtusa*. The fronds are 7—8 feet long, according to the late Rev. L. Guilding.

*** Fronds bipinnate or decompound.*

5. H. *horrida*, Br.; aculeated, fronds bipinnated clothed beneath at first and on the rachis with cobwebby tomentum, pinnules large ovate acuminate deeply pinnatifid almost to the base, segments lanceolate short-acuminated or acute lobato-dentate the lower ones almost again pinnatifid with blunt short lobes, sori following the course of the margin but descending in a double line below the sinuses half way down to the costa, veins pinnated, lower veinlets of the segments often angularly anastomosing. (TAB. XV.) Cyathea horrida, *Sm. Presl.* Polypodium horridum, *L. Plum. Fil. t.* 8. Cyathea commutata, *Spr.* (*excl. the syn. of Plum. t.* 14.)

Hab. St. Domingo, Martinique, *Plumier*. Trinidad, *Lockhart*. Jamaica, *Dr. Distin*. St. Vincent, *Rev. L. Guilding*. Jamaica, *Dr. Mac Fadyen*. — From Plumier's description this does not appear to be arborescent; for he says, "Ex hujusce Filicis radicibus longis, nigris, exilibus et densè confertis, costæ seu cauliculi promanant, simplices, quatuor pedes circiter alii, pollicem crassi, recti, teretes, paulo antica parte canaliculati, nigricantes, splendentes, ac circumquaque aculeis rigidis, nigris et longiusculis pollentes." — Pinnules in our specimens 1—1½ foot long, ovate, sessile: at once distinguished from the two preceding by the great size and form of the pinnæ, deeply divided into long, acute or acuminated segments, as well as by the much ramified veins, and the copious fructification at first sight apparently scattered without order, and forming, as it were, a broad band close to the margin all round the pinnules:—yet if this be accurately examined, the sori will be seen to be placed with great regularity, in a single line or series, following the edge of the shallow lobes, but extending down from the sinus about half way to the costa, then returning up into the margin of the adjoining lobe.

6. H. *petiolata*, Hook.; unarmed, fronds triplicato-pinnate, pinnules lanceolate petiolate acuminate lobato-pinnatifid upper ones coadunate serrated (not lobed) terminating in an acuminated point, sori at the very margin continuing close under the sinus in an uninterrupted line, veins pinnated, the lower veinlets angularly anastomosing. (Tab. XVI.) H. marginalis, *J. Sm. in Hook. Lond. Journ. of Bot. v.* i. *p.* 622, (*name only*).

Hab. Isthmus of Panama, *Dr. Sinclair.*—A perfectly distinct and well-marked species. Each pinna is a foot and more long, pinnated with remote petiolated pinnules, the upper portion only pinnatifid with simply serrated (not lobed) segments. The sori form a beautiful, beaded border along the margin, constituting a single series, not descending below the sinus, but keeping close to its margin.

7. H. *Hostmanni*, Hook.; stipes and main rachis scaly especially at the base of the former and there aculeated, fronds bipinnated, pinnules oblong very obtuse sessile but cuneate at the base, membranaceous pinnatifid or lobed half-way down to the rachis, upper ones coadunate and decurrent, sori remote half-way between the sinus and the rachis situated on the middle of the lower veinlets all of which are simple and free. *Hook. Ic. Pl. v.* vii. *t.* 646.

Hab. Dutch Guiana, *Hostmann*, *n.* 64.—A very distinct and well-marked species, of which I possess an entire frond about 4 feet long, including the stipes, which is a foot and a half, rich mahogany brown, on one side densely clothed with long dark brown glossy scales, on the other muricated with short aculei. Pinnæ remote, a foot long (the largest), sessile, broad lanceolate, pinnated with oblong, very obtuse pinnatifido-lobate pinnules, the lobes rotundato-ovate, obtuse, entire, of a thin and flaccid texture, nerves of each lobe pinnated, only the lowest pair of veinlets (all of which are simple and free) bearing, near the middle, each, a solitary sorus, so that on the pinnules the sori are distant, and form a line very remote from the margin, half way between the sinus and the rachis. The upper pinnules are confluent, at first simply combined by a decurrent wing, then united into a lobed margin and terminating in a blunt entire acumen. The rachis of the pinnæ is rough and somewhat scaly, that of the pinnules slightly strigoso-hispid.

8. H.? *Guianensis*, Hook.; unarmed? rachis and even the costa beneath slightly scaly and hispidly strigose, fronds bi-tri-pinnate, secondary rachis distinctly winged especially upwards between the pinnules, pinnules sessile oblong-lanceolate ending in an obtuse entire acumen pinnatifid rather more than half way down to the rachis membranaceous, segments ovate obtuse entire, veins free forked near the middle, sori few in each segment (2—4) on the axil of the fork rather nearer the margin than the costa, involucre ciliated often forming 2 or 3 irregular lobes chiefly but not entirely on the inferior side of the sorus. *Hook. Ic. Fil. v.* vii. *t.* 648.

Hab. British Guiana, *C. S. Parker, Esq.* — I do not find this anywhere described, nor am I clear that it should not be placed in *Cyathea*. In habit and form of the pinnules it has the closest affinity with the following; but the involucre is dissimilar.

9. H. ? *Parkeri*, Hook.; unarmed ? fronds bi-tri-pinnate, main rachis slightly scaly and together with the lesser rachis costa veins (more or less) and margin clothed with numerous spreading hairs, rachis between the pinnules distinctly winged, pinnules sessile oblong-lanceolate bluntly acuminated pinnatifid about half way down subcoriaceo-membranaceous segments ovate obtuse entire, veins all free forked above the middle and bearing the sori (several in each segment) in the axil of the fork and rather nearer the margin than the costa, involucre rather small ciliated dimidiate often bifid in age. *Hook. Ic. Pl. v.* vii. *t.* 643.

Hab. British Guiana, *C. S. Parker, Esq.*—The winged rachis, very distinct in the upper part between the pinnules, is a striking character in this and the preceding species: but this is easily recognized by its copious hairs and more abundant sori and very different involucre, which I think may be considered entirely that of a *Hemitelia;* though the general habit approaches nearer that of a true *Cyathea* or *Alsophila*.

10. H. *multiflora*, Br.; "fronds bipinnate, pinnules oblong-lanceolate acuminate pinnatifid, segments oblong obtuse obtusely serrated, rachis winged, caudex arborescent." *Willd.* Cyathea multiflora, *Sm. Willd. Sw.* Alsophila, *J. Sm.* Amphicosmia multiflora, *Gardn. in Hook. Lond. Journ. of Bot. v.* i. *p.* 441.

Hab. Jamaica; ex Herb. Banks. (*Smith*).—With this I am unacquainted, and Mr. Brown is the authority for its being referred to *Hemitelia*. Sir Jas. Smith, with whom the species originated, has merely said of it (under *Cyathea*) "Caudice ——, fronde bipinnata pinnatifida, laciniis obtusis serratis, rachi alata, floribus sparsis, calyce lacero." Willdenow, who seems to have been acquainted with the species, and whose character I have given above, further remarks upon it, "Rachis margined on each side with a narrow decurrent line. Partial pinnæ 2 feet long. Pinnules 4 inches long, an inch broad at the base, lanceolate, acuminate, pinnatifid. Segments 5 lines long, oblong, rather acute, obtusely serrated." Unfortunately neither Smith nor Willdenow alludes to the venation, nor, except the brief notice of the former, to the involucres. Mr. J. Smith, who, as well as Mr. Gardner, has examined the original specimens, says that, as far as can be judged from the imperfect specimens, it differs from the preceding (*H.? Parkeri*) only in wanting the coarse hairs on the rachis. Mr. Gardner considers it allied to *Alsophila Capensis*.

Doubtful Species.

11. H. *munita*. Cnemidaria munita, *Pr.* Cyathea, *Willd.*

Hab. ——? — This, to the best of my knowledge, is nowhere described. Presl places it in *Cnemidaria*, whence I have noticed it here.

12. H. *serrata, J. Sm. in Hook. Lond. Journ. of Bot. v.* i. *p.* 662, (*name only*).

13. H. *monilifera, J. Sm. in Hook. Lond. Journ. of Bot. l. c. p.* 662, (*name only*).

14. H. *cruciata*, Desv.; "pinnæ opposite sessile linear-lanceolate subacuminate patent deeply crenate, with the segments somewhat imbricated incurved (obtusisque apici latere acutiusculis) obscurely toothed, costa and rachis naked, caudex arborescent?" *Desv. in Mém. Soc. Linn. Par. v.* ii. *p.* 521.

Hab. Tropical America, (*Desvaux*). "Intermediate between *H. grandifolia* and *speciosa*," (an *obtusa?*). The latter remark would lead one to infer that *H. obtusa* or *H. grandifolia* is here intended; but nothing can be learned from the specific character, a part of which, inserted above in a parenthesis, is unintelligible to me.

15. H. *stigmosa*, Desv.; "fronds decompound? partial ones pinnatifid, pinnules subpetiolate rather deeply pinnatifid decurrent, segments oblong obtuse entire stigmatose above (supra stigmatosis) with a solitary sorus at the base, partial rachis margined at the apex ferrugineo-pilose beneath." *Desv. l. c. p.* 321.

Hab. Tropical America, (*Desvaux*).

16. H. *cyathoides*, Desv.; "fronds decompound, partial ones bipinnate, pinnæ petiolate winged at the middle of the rachis acuminately obtuse (acuminatè obtusis), pinnules slightly pinnatifid glabrous, the segments suboblong obtuse repando-subdenticulate, sori on each side at the base of the segments nearly solitary, rachis downy above." *Desv. l. c. p.* 321.

Hab. Guiana, (*Desvaux*). "Segments nearly linear."

17. H. *cordata*, Desv.; "pinnules lanceolate acuminate shortly petiolate repando-dentate nearly cordate at the base subauriculate serrated at the apex, sori in an uninterrupted series near the costa, rachis purple-black glossy downy above, caudex arboreous?" *Desv. l. c. p.* 321.

Hab. Madagascar, (*Desvaux*). "Pinnæ a foot and a half long and more. Pinnules nearly 2 inches long, 4—5 lines wide."—This probably belongs to some genus very different from *Hemitelia*.

18. H. *laciniata*, Spreng.; "herbaceous unarmed, frond supra-decompound glabrous flaccid, leaflets oblong-lanceolate obtuse repand, sori small rather remote in two rows." *Spreng. Syst. Veget. v.* iv. *p.* 126. "Polypodium laciniatum, *Forst. Herb.*"

Hab. New Hebrides, *Forster*. — This also has most likely nothing to do with *Hemitelia*.

Omitted after *Hemitelia horrida*, *p.* 30.

5.* H. *Imrayana*, Hook.; unarmed? fronds bipinnate? glabrous, pinnules large broadly oblong-lanceolate acuminate

deeply pinnatifid almost to the base, segments lanceolate acuminate serrated, sori following the course of the margin in a nearly single series, and reaching to the main costa at the sinus, veins pinnated, veinlets 2—3, lower ones often anastomosing. *Hook. Ic. Pl. t.* 669.—*β.* segments coarsely serrated. H. serrata, *J. Sm. in Hook. Lond. Journ. of Bot. v.* i. *p.* 662, (*name only*).

Hab. Dominica, *Dr. Imray*, 1839. *β.* Jamaica? *Wiles?* (*Herb. J. Smith*). — At first sight this has a good deal the appearance of the preceding, *H. horrida;* but the pinnæ are much narrower, smaller, 10—12 inches long, apparently always glabrous, the segments serrated, the veins much less copiously pinnated. The *H. serrata*, J. Sm. (without character), may, I think, be safely considered a variety of this. (v. supra p. 32, n. 12).

3. ALSOPHILA, *Br. Mart.*

Cyatheæ sp. *of authors.* Hemitelia (1 sp.), *Br. Presl.* Amphicosmia, *Gardn.* Metaxya, *Presl.* Gymnosphæra, *Bl.* Chnoophora, *Kaulf.* Trichopteris, *Presl.* Amphidesmium, *Schott.*

Sori globose, situated upon a vein or in the axil of a fork. *Receptacle* elevated, frequently villous, punctiform in the subgenus *Metaxya*. *Involucre* none, unless a loose laciniated deciduous scale seen in some species and inserted at the lower side of the base can be so called, or a minute indistinct membrane covered by the sorus, or a few hairs radiating from the base. *Veins* pinnated, simple or forked, free. — Arborescent Ferns, *similar in general habit and structure to* Cyathea (A. pruinosa *excepted*). — HOOK. GEN. FIL. TAB. 9 and 21. TAB. 42. A. (Hemitelia, *Br.*) TAB. 42. B. (Metaxya, *Pr.*) TAB. 34. (Trichopteris, *Pr.* Chnoophora, *Kaulf.*) TAB. 100, (Gymnosphæra, *Bl.*)

OBS. The plants which I refer to this genus are those *Cyatheaceæ* in which there is no real or evident involucre; for I do not consider as such the lax, deciduous, fimbriated scale seen at the base of *Hemitelia Capensis*, Br., and *Alsophila aspera*. The learned and accurate Brown indeed viewed the scale in question in a different light, when he referred the former plant to his genus *Hemitelia*. If it be a true involucre, I do not see how some other *Alsophilæ* which have deciduous scales under the sorus, especially *A. aspera* (see Bauer's figure in HOOK. GEN. FIL.) can be retained in *Alsophila*.

If the genus *Cyathea* be difficult of determination, so far as the species are concerned, the same difficulties exist here, and greater ones still, because it is scarcely possible in several cases, with our imperfect specimens, to say whether many should be referred to *Polypodium* or to *Alsophila*.

Subgen. I. METAXYA. *Veins free, simple, rarely forked and only near the base, copious, parallel, very patent. Sori one on each vein forming a line or series close to the costa, and there are frequently others higher up on the same veins. — Tropical America. Fronds pinnate. Pinnæ large, simple, a foot or*

more long, glossy, firm.—Metaxya, *Pr.* Hŏok. Gen. Fil. tab. 42, B. Amphidesmium? *Schott.* Alsophila, § I. Chnoophora, in part, *Mart.* (*nat* Chnoophora, *Kaulf.*)

1. A. *blechnoides*, Hook.; fronds pinnate, pinnæ lanceolate serrated upwards and acuminated into a long narrow point, sori generally on the lower half of the nerves.—Polypodium blechnoides, *Sw. Syn. Fil. p.* 73. P. rostratum, *Willd.* (*not Lam. and Sw.*) P. Humboldtii, *Poir.* P. Parkeri, *Hook. et Grev. Ic. Fil. t.* 232. Aspidium rostratum, *H. B. K.* Alsophila rostrata, *Mart. l. c. t.* 39, (*excellent*).—β. *polycarpa*; sori extending almost to the margin of the pinnæ.

Hab. Woods, Guiana (*Swartz*), *Mr. Parker, Schomburgk, n.* 18 *and* 313. *Hostmann, n.* 73. Orinoco, *Humboldt.* Province of Para and Rio Negro, Brazil, *Martius.* Guatemala, *Skinner.* Isle of Gorgona, west coast of Panama, *Barclay.* Panama, *Cuming, n.* 1126. Peru, *Poeppig, in Herb. nostr.*—β. Dutch Guiana, *Hostmann, n.* 1080.—A very beautiful species, varying in the size and breadth of the pinnæ, which are sometimes a foot and more long, but always terminating in a long, acuminated, narrow point. The *var.* β. has, besides the line forming the linear series near the base, the rest of the numerous sori extending to near the margin of the pinnæ, and the margin is waved and jagged; and in this respect is what Martius alludes to, when he says "variat interdum pinnis grosse lobatis et altius dentatis."

Subgen. II. Trichopteris. *Veins parallel, twice or thrice forked, patent. Sori solitary on the veins or in the upper forks, forming a more or less regular or continuous line or series the length of the pinnule. Capsules mixed with copious long persistent hairs.—Tropical America. Fronds bipinnate. Pinnæ moderately large,* 4—6 *inches long.*—Trichopteris, *Presl.* Hook. Gen. Fil. tab. 24.

2. A. *Tænitis*, Hook.; aculeated, fronds bipinnate, pinnules lanceolate acuminate glabrous more or less serrated or entire between coriaceous and membranaceous, sori in an uninterrupted series intermediate between the costa and margin.—A. excelsa, *Mart. l. c. p.* 63, *t.* 37. Polypodium Tænitis, "*Roth, Nov. Sp.* 394," (*according to Kaulf.*) Trichopteris excelsa and denticulata, *Pr.* Polypodium Corcovadense, *Raddi, Fil. Bras. p.* 26, *t.* 40.

Hab. Brazil, frequent about Rio and Corcovado; St. Sebastian, Minas Geraes and elsewhere, *Menzies, Martius, Gardner, n.* 5335 *and* 5336, *Capt. Beechey, Raddi, Macrae, Sellow.*—Varying in the size and breadth of the pinnules and in the serratures: generally the substance is firm, but not thick, sometimes almost membranaceous. Line or series of fructifications continuous, regular. The copious hairs persist long after the capsules have fallen away.

3. A. *elegans*, Mart.; aculeated, fronds bipinnate, pinnules thick and coriaceous (fleshy? when recent) lanceolate acute

mostly entire slightly hairy and scaly beneath, sori in 2 or 3 series forming an unequal broad and more or less interrupted series nearer the costa than the margin.—*Mart. l. c. p.* 63, *t.* 38. Trichopteris elegans, *Pr.*

Hab. Brazil, *Sellow, in Herb. nostr.* Woods of St. Paul and Minas Geraes, *Martius.*—This is probably a rare, but very distinct, species. My only specimen is from the Royal Herbarium of Berlin, and was gathered by Sellow, probably in South Brazil. Besides the much less acuminated pinnules and the thicker texture, the veins are more sunk and less evident than in the preceding; and the sori are more scattered, forming a very interrupted, thick, broad and irregular linear series; in this respect, as it were, connecting this section with the preceding, which indeed Martius has done (*Sect.* CHNOOPHORA); and certainly invalidating the characters as distinct genera. The original *Chnoophora* of Kaulfuss, however, let it be observed, is a true *Alsophila*, (*A. villosa*, Kze.)

Subgen. III. EUALSOPHILA. *Veins free, simple or forked, rather remote, obliquely patent from the main trunk or costa; branches diverging (not parallel). Sori solitary at the base or about the middle of a vein or in the axil of a fork.—Tropical or sub-tropical, of the old and of the new world; bi-tripinnate; pinnules pinnatifid, segments generally small. Sori few and scattered on the segments, or sometimes forming a line, but frequently not a continuous one (owing to the remote or distinct sori) between the margin and costa.* HOOK. GEN. FIL. TAB. 21, 42 & 100.

§ I. *Sori with a spurious Involucre at the inner base.*

4. A. *Capensis*, J. Sm.; unarmed, fronds triplicato-pinnate, pinnæ lanceolate acuminate pinnatifid almost to the rachis, segments narrow-oblong acute falcate membranaceous serrated, rachis and costa with small bullate deciduous scales, and one lax laciniated one at the inferior base of each sorus persistent? veins all simple or very rarely forked dark-coloured, sori much elevated cylindrical generally solitary at the base of the lowest vein on the upper half of the segment. —Polypodium Capense, *L.* Aspidium Cap. *Sw.* Cyathea Cap. *Sm.* Hemitelia Cap. *Br., Presl, Mart. Hook. Gen. Fil. t.* 42, A. Cyathea riparia, *Willd.* Amphicosmia riparia, *Gardn. in Lond. Journ. of Bot. v.* i. *p.* 441, *t.* 12 (*excellent*). —*β. polyantha:* sori 4—6 on each segment.

Hab. Moist watery places, Cape of Good Hope, *Thunberg and other travellers.* Java, *Blume, Milleti.* Brazil, *Martius.* Organ Mountains, and Villa Rica in Minas Geraes, *Gardner* (*n.* 5954). "Trunk or caudex 12—14 feet high; grows in mountain ravines in many parts of the Cape Colony: there is a noble forest of this Fern in the moist woods above 'Paradise,' on the east side of Table Mountain," *Harvey.*—Various are the opinions respecting the genus of this elegant arborescent Fern. Mr. Brown placed it in his genus *Hemitelia*, with which it accords in the simple veins and in the presence of a scale under the sori, which that learned botanist, as well as others, considers in the light of a true involucre: but to me this

supposed involucre appears to be of the nature and texture of the bullate scales common on this and other Cyatheaceous plants, not membranaceous or resembling as it were a pellicle, but soft and succulent and vasculose, similar also to what are figured by Mr. Bauer at the base of the young sori of *Alsophila aspera*, Hook. Gen. Fil. tab. 21, f. 1, 2. Presl retains the name of *Hemitelia* to the present plant, removing from it the other species which Mr. Brown intended as the types of the genus (*Cnemidaria*, Pr.), on account of the lower anastomosing veins and the different form of the involucre: ascribing to the present plant an "indusium inferum, dimidiatum, semi-involucrans, concavum, latere superiore deficiente;" and "sorus in qualibet lacinia solitarius;" which latter is not a constant character. Mr. Gardner considers it desirable to separate our plants both from *Hemitelia*, Br. and *Alsophila*, and, finding the species to inhabit the new, as well as the old world, gives to it the name of *Amphicosmia*. To this he adds the *Cyathea multiflora*, Sm. (*Hemitelia*, Br.) In the same volume of the 'London Journal of Botany' in which Mr. Gardner's paper appears, Mr. J. Smith has given his views of the genus *Alsophila*, which he makes to depend on the "veins (or venules) forked or simple free, sori axillary or medial, involucre semicalyciform or sometimes very small or absent:" — and then he has two sections, the one characterized by the presence of a more or less distinct involucre, and that he subdivides by the simple and forked veins: and thus our *A. Capensis* comes into his first section, with several other species having spurious or very imperfect involucres. In the union of our plant with *Alsophila* I entirely agree, and only differ from Mr. J. Smith in not laying so much stress as he does upon the value of the supposed involucre. The simple or forked veins have the advantage at least of being more apparent: but they are liable to great modifications. Indeed, as regards the fructification, there are so many and such insensible gradations from the most perfect cup of *Cyathea arborea* to the entirely naked sori of true *Alsophila*, and the slight differences in venation are accompanied by so little of natural habit, that the older Pteridologists were not very wrong who looked upon the whole of this group as one genus, *Cyathea*.

So far from the sorus being universally solitary on each segment of this species, I possess specimens with as many as six upon a segment: when that is the case, the one or two lower ones (as may also be observed when solitary) is at the base of a vein; but the others are placed higher up. I have occasionally seen a forked vein, but have never observed the sorus in the axil of it. Receptacles always very long, cylindrical, hairy.—Extended as the remarks are already on the *Alsophila Capensis*, I must not quit the subject without mentioning a remarkable change, as it appears, that many of the pinnæ have undergone on the lower part of the stipes. They may be called abortive pinnæ, and are short, 3—4 inches long, many times multifid, with narrow linear membranaceous hyaline segments with a rigid costa; and at first sight so much resembling some *Trichomanes* or *Hymenophyllum* in a barren state, growing parasitically on the *Alsophila*, that Kaulfuss has described them under the name of *Trichomanes? cormophyllum*, (*Enum. Fil. p.* 266).—The specific appellation "*riparia*," Willd., selected by Mr. Gardner, is doubtless more appropriate, now that the plant has been found not only at the Cape, but in Java and in Brazil: but this circumstance scarcely warrants the change of an old Linnæan name.

5. A. *latebrosa*, Wall.; stipes and main rachis muricated with short elevated points, fronds bipinnate, pinnæ lanceolate, pinnules narrow-lanceolate acuminate pinnatifid almost to

the rachis, segments narrow-oblong acute falcate subcoriaceous serrated, rachis and costa with small bullate scales, and one generally at the base of the sorus, veins all once forked, sori much elevated cylindrical copious occupying nearly the whole segment. Polypodium latebrosum, *Wall. Cat. n.* 318 (Alsophila in index).

Hab. Penang, *Dr. Wallich.* Assam, *Mrs. Mack, Major Jenkins.*—Stipes dark mahogany-brown. Pinnæ slender and graceful. In general habit a good deal allied to *A. Capensis*, and especially in the very prominent and almost cylindrical sori, beneath which, frequently, but not always, a concave scale is attached, showing a still further affinity with the preceding. Here however the frond is more coriaceous, the veins are always forked, the fructifications are more copious. In the present species the receptacle is frequently split or forked.

§ II. *Sori destitute of involucre, or so minute as to be wholly covered by the sorus and with difficulty observed.*

* *Species of the West Indies, Mexico and South America.*

6. A. *Miersii*, Hook.; rachis aculeated with slightly deflexed prickles, fronds (bi?) pinnate, pinnules remote free even to the terminal one narrow-lanceolate much and gradually acuminated the long acumen serrated cuneate at the base the rest pinnatifid half-way to the rachis glabrous, bullate scales none, segments ovate obtuse nearly entire, veins simple and forked, sori on all the segments chiefly occupying the lower portion situated half-way between the costa and the margin, receptacles hairy. A. acuminata, *J. Sm. Gen.* (*name only*).

Hab. Organ Mountains, *Gardner, n.* 117. Tejuco, *J. Miers, Esq.*—An extremely well-marked Fern, with glabrous, glossy fronds: the pinnules much elongated, 6—8 inches long, gradually acuminated into a finely serrated point, the whole of which is destitute of fructification; this latter is confined to the segments, and is situated on the veins or forks of the veins, the two series of which take the shape of the segments, being placed about equidistant between the costa and the margin. Receptacles slightly elevated, hairy.

7. A. *procera*, Kaulf.; aculeate, fronds bipinnate, pinnules nearly sessile the ultimate ones united into a pinnatifid acuminated apex everywhere glabrous sinuato-pinnatifid lanceolato-acuminate truncate at the base, the segments short rounded oblique obtuse quite entire with bullate scales upon the rachis and costa, sori in 2 series half-way between the costa and margin on the simple veins, receptacles elevated scarcely hairy.—A. procera, *Kaulf., Mart. Pl. Crypt. Bras. p.* 64 *et* 40. Polypodium procerum, *Willd.* P. pungens, *Willd.* (*according to Martius*). A. Arbuscula, *Presl* (*specimen in Herb. nostr.*)

Hab. Brazil, Provinces of St. Paul, Minas and Para, *Martius.* Organ

Mountains (*n.* 114) and Tejuco (*n.* 5673) *Gardner.* — Quite different from any previously described species of the genus; the pinnules, 2—4 inches long, being very slightly pinnatifid, the segments short and blunt; the sori dispersed over all the pinnatifid portion.

8. A. *Hookeriana*, Klotzsch; stipes and rachis strongly aculeated, fronds everywhere glabrous or pubescent on the partial rachis subcoriaceous, pinnules shortly petiolate lanceolate slightly and obtusely acuminated cuneate at the base, segments short rounded obtuse oblique quite entire, veins simple and forked, sori in 2 series half-way between the costa and margin, bullate scales none, receptacles elevated hairy, rachis of the pinnæ winged between the upper pinnules. A. Hookeriana, *Klotzsch in Herb. Reg. Berol.*

Hab. South Brazil, *Sellow.* St. Catherine's, *Lay and Collie.* — This I was at first disposed to make a variety of the preceding, but it is probably different: the stipes is very much aculeated, the fronds are more coriaceous, the pinnules not truncate at the base nor by any means so acuminated at the apex, the veins are more frequently forked, the receptacles more hairy and the capsules less crowded and compressed. A distinct wing appears on the rachis of the pinnæ, between the upper pinnules, in which respect it resembles the following species.

9. A. *armigera*, Kze.; "fronds bipinnate, pinnules nearly sessile falcate lanceolate the upper ones abbreviated incisopinnatifid, the segments obtuse or truncated, sori forming a line along the veins of each segment, partial and universal rachis winged above and hairy rough beneath, stipes aculeated above, beneath rigidly paleaceous. Alsophila? armigera, *Kze. Syn. Plant. Crypt. Poep. p.* 98.

Hab. Ventanilla de Cassapi (Maynas, *in Herb. nostr.*), *Poeppig.*—Allied to *A. procera*, but partially downy, very downy on the main rachis. Pinnules also larger and rather more deeply pinnatifid. On the underside the veins are nearly of the same color as the frond: in that respect approaching *A. aspera*. There are hairs among the sori on the receptacles.

The above four preceding species differ from the rest of this group, in the shallow segments of the pinnules, the deepest of them not being cut half way down to the rachis. The following species however, *A. aspera*, is, as it were, intermediate in that respect.

10. A. *aspera*, Br.?; stipes and rachis aculeated, main and partial rachis above strigillose slightly scaly beneath and on the costa the rest glabrous shining, fronds bipinnate coriaceous, pinnules shortly petiolate oblong pinnatifid one half or two thirds the way down with an acuminated point, segments oblong-ovate rather acute serrulate, costa and simple or forked veins of the same color and texture as the frond, bearing small bullate scales, sori very deciduous in 2 series intermediate between the costa and margin, receptacles moderately elevated with few hairs. A. aspera, *Br.? Hook. et Grev. Ic.*

Fil. t. 213—215. *Hook. Gen. Fil. tab.* 5—11 *an* 1—4? Cyathea aspera, *Willd.*?—Cyathea muricata, *Sieb. Fl. Mixt. n.* 337, (*and Fl. Martin. n.* 374, *according to Kaulf.*). *Kaulf. Enum. Fil. p.* 259? *non Willd. Sp. Pl.* v. *p.* 497. A. nitens, *J. Sm. Gen. Fil.* (*name only*). — β. more aculeated, aculei longer. (Tab. XIX. B.)

Hab. Martinique, *Sieber.* Jamaica, *Bancroft, Macfadyen, Purdie.* — β. St. Vincent's, *L. Guilding.*—Probably different authors have had different plants in view for their *Cyathea* or *Alsophila aspera* and *Cyathea* or *Alsophila muricata.* I have referred to the published specimens of Sieber for the plant here described. It is probably abundant in the West Indian islands. Mr. Purdie speaks of it as very frequent in Jamaica, and as having a slender stem, 20—30 feet high, but not more than 2½ inches in diameter. I find no involucre whatever to the sori, and it would appear that the capsules do not remain long in a compact form, but are quickly deciduous, leaving a small receptacle, slightly elevated and moderately hairy. Fronds very ample. Pinnæ 2 feet and more long, texture coriaceous, glossy, veins conspicuous, prominent on the underside, and what is not common in the genus, exhibiting a color and texture exactly analogous to that of the surrounding parenchyme; or in other words, as if the same parenchyme covered the veins. Kaulfuss considers Sieber's plant the same with that of Willdenow; but whether it be identical with the original species of Plumier (*Fil. t.* 3), from which Willdenow seems to have derived his character, will probably long remain doubtful. See p. 18 of this volume, where I have thought it right to include the name and character of *Cyathea aspera* and of *C. muricata*, from Willdenow. My specimens from St. Vincent have the stipes and main rachis with much longer aculei, but they are not otherwise at all different; it is that state which is figured at our Tab. XIX. B.

11. A. *armata*, Presl; stipes and main rachis aculeate with short prickles, rachis and fronds beneath clothed with fulvous spreading hairs, fronds bipinnate coriaceous, pinnules linear-lanceolate acuminate, scattered chaffy scales beneath, segments lanceolate subfalcate slightly obtuse crenate, veins forked above the middle, sori copious covering the whole segment. A. armata, *Presl, Pterid. p.* 62. A. Swartziana, *Mart. Pl. Crypt. Bras. p.* 73, *t.* 49. A. vestita, *J. Sm. Gen. Fil.* (*name only*). Polypodium armatum, *Sw.* — β. fronds very hairy on the upper side. — γ. pinnules more deeply serrated.

Hab. Jamaica, *Swartz, Dr. Bancroft, Purdie.* Brazil, *Sellow.* — β. Island of Gorgona, Central America. — γ. Tejuca near Rio de Janeiro, *Mr. Miers, in Herb. Gardner. n.* 118. Cocos Island, Central America, *Mr. Menzies.* — I have followed Presl in retaining Swartz's name of *armata* to this plant, which Martius shows by a figure from Swartz's own specimen to be the *Polypodium armatum* of Swartz; but which Martius has changed to *Swartziana*, and given the previous name to another species, *A. ferox*, Pr. Our plant entirely resembles Martius' figure, except that the hairs are more fulvous in our specimens. The base of the stipes is clothed with long, glossy, chestnut-colored scales.

12. A. *Gardneri*, Hook.; everywhere clothed with brownish woolly hairs especially beneath, stipes aculeate, fronds

bipinnate, pinnules lanceolate acuminate sessile deeply pinnatifid nearly to the rachis, numerous small bullate scales beneath, segments oblong very obtuse entire everywhere clothed with sori even to the acuminated apices. — β. nearly glabrous above and less hairy beneath. Cyathea nigrescens, *Klotzsch in Herb. Reg. Berol.*

Hab. Woods, San Gaetano, Brazil, *Gardner, n.* 5330.—β. South Brazil, *Sellow.*— This species in some respects resembles *A. armata*, but is more universally hairy or almost woolly, and the hairs are less tawny; the segments are broader, and more obtuse and entire.

13. A. *ferox*, Presl; more or less pubescenti-hirsute especially on the nerves, rachis and stipes with long sharp aculei, fronds bipinnate, pinnules sessile broadly lanceolate narrow acuminate deeply pinnatifid almost to the rachis, segments linear-oblong falcate serrated, small bullate scales beneath, nerves forked, sori copious but not wholly covering the segments. A. ferox, *Presl, Pterid. p.* 62. Cyathea ferox, *Pr.* Alsophila armata, *Mart. Pl. Crypt. Bras. p.* 72, *t.* 48, (*not Presl*). Polypodium aculeatum, *Raddi, Fil. Bras. t.* 41. Chnoophora aculeata, *Kaulf. in Herb. Mart.* — β. costa beneath with more copious bullate scales.—γ. segments broader, costa with numerous scales beneath. A. Sellowiana, *Presl.*

Hab. Brazil, probably frequent, *Raddi, Martius, Mr. Boog, Gardner, n.* 27. Bahia, *Saltzmann.* British Guiana, frequent, *C. S. Parker, Esq.* Surinam, *Splitgerber.*—β. Guiana.—γ. S. Brazil, *Sellow.*—This appears to be a very distinct species, of which an excellent figure is given by Martius, and another by Raddi. It should rank near to *A. armata*, Presl; but it is much less hairy, and the segments are generally narrower: yet in these respects the plant seems liable to vary, and my var. γ. has been deemed deserving of specific distinction by our friend Dr. Klotzsch. On similar grounds our present species of *Alsophila* might be increased four-fold.

14. A. *leucolepis*, Mart.; "frond bipinnato-partite slightly strigilloso-hirsute on the nerves and nervules above beneath with the scales and scalelets large, stipes aculeate, partial rachis unarmed, pinnæ linear-oblong acuminate, pinnules linear acuminate pinnatifid, segments between the rounded sinuses linear-lanceolate subfalcate sinuato-dentate, sori 10—12 on the segments." *Mart. Pl. Crypt. Bras. p.* 70, *t.* 46.

Hab. Brazil; Province of Minas Geraes, *Martius.* Near Inficionado, *Gardner, n.* 5329. Woods, Gongesoco, *Gardner, n.* 5331. — From the general appearance of Mr. Gardner's specimens, and the presence of the copious white scales beneath, I can have little hesitation in referring them hither; but the segments of the pinnules are broader, and there are none or but very few of those larger scales which form so conspicuous a feature in Martius' plant. The whole frond is very opaque (not glossy), and in Mr. Gardner's *n.* 5331, there are still fewer of the large scales, and the veins are frequently simple as well as forked.

15. A. *phalerata*, Mart.; "frond bipinnato-partite strigillose on the veins above slightly downy beneath elsewhere glabrous, stipes aculeolate at the base, pinnæ in their circumscription narrow-oblong acuminate, common and partial rachis unarmed strigillose above, pinnules linear acuminated pinnatifid serrated at the apex, segments linear-oblong obtuse somewhat serrated towards the apex those towards the summit crenate on their anterior edge (anticé crenata), the uppermost confluent into crenated pinnæ, sori biseriate in the inferior part of the segments." *Martius, Pl. Crypt. Bras. p.* 67, *t.* 42. Cyathea phalerata, *Martius, olim.*—β. costa with a few small scattered scales beneath.

Hab. Brazil: woods in the Province of Bahia, *Martius.*—β. Ilhios, *Moricand.* Demerara and Guadeloupe, *C. S. Parker, Esq.* Dominica, *Dr. Imray, n.* 110.—Our specimens from Moricand, Mr. Parker and Dr. Imray, altogether agree with the figure and description of Martius, except that they have, generally, small scales beneath the pinnules, which appear wanting in the original plant. The veins are often twice forked, the forking commencing below the middle, so that the sori are nearer the costa than the margin. In some of Dr. Imray's specimens the segments are more elongated, narrower, and frequently more serrated.

16. A. *infesta*, Kze.; "frond bipinnate, pinnules unequal at the base pinnatifid acuminate, segments oblong falcate rather obtuse, sori uniseriate approaching the margin, rachis puberulous furrowed and paleaceous, stipes chaffy above aculeate below." *Kze. Syn. Pl. Crypt. Poepp. p.* 98. — β. pinnules narrower and more scaly beneath. Alsophila fumata, *Klotzsch in Herb. Reg. Berol.*

Hab. Maynas, Peru, *Poeppig in Herb. nostr.* British Guiana, *C. S. Parker.* Dominica, *Dr. Imray, n.* 119.—β. South Brazil, *Sellow.*—A comparison of my Guiana plant with an authentic specimen of *A. infesta*, Kze., shows it to be the same. The pinnules are rather broad, membranaceous, the segments ovato-oblong, obtuse; the sori in a double line, occupying but a small portion, comparatively, of the segment between the costa and margin, but placed nearer the latter. The veins are simple or forked towards the margin; scales few, almost obsolete.—Var. β. may possibly prove a different species; it is smaller, the pinnules narrower, the veins almost wholly simple, and there are small ovate and acuminated bullate pale scales on the costa beneath. On Dr. Imray's specimens the young sori exhibit a very minute and imperfect involucre apparently consisting of small erect scales, which become obsolete as the fruit advances to maturity.

17. A. *compta*, Mart.; "frond bipinnate slightly hairy and paleolate, general and partial rachis beneath sparingly aculeate slightly hairy above, pinnules linear acuminate somewhat triangular and entire at the apex pinnatifid, segments linear-oblong obtuse, sterile ones serrulate, upper pinnules simple linear falcate the uppermost united into a pinnatifid

pinna." *Martius, Pl. Crypt. Bras. p.* 66, *t.* 41. Cyathea compta, *Martius, olim.*

Hab. Brazil; Province of St. Paul, *Martius.* Caraccas, *Linden.* Tabasco, Mexico, *Linden, n.* 1919.—If I am not greatly mistaken, the above two *Alsophilas* of Linden from Caraccas and from Mexico, are identical with *A. compta*, Mart. They exhibit the same form of pinnules, and the veins are alike, except that the forking in our specimens takes place nearer the margin than is represented in Martius' figure.

18. A. *elongata*, Hook.; sharply aculeated, glabrous except on the rachis above, fronds bipinnate, pinnules lanceolate much elongated pinnatifid nearly to the rachis terminating in a long narrow serrated acumen, segments remote linear rather acute rigid much falcated the margins recurved serrated, veins twice or thrice forked from near their base, sori numerous covering the entire segments except at the apex, bullate scales none or deciduous, receptacle very hairy.

Hab. Columbia, probably the low plains, *Hartweg, n.* 1528. — This has the appearance of being a distinct species, at any rate it is considerably dissimilar from any that I am acquainted with. In the crowded fructifications it resembles the *A. armata :* but the pinnules are very different. The single pinna in my herbarium is nearly 3 feet long, rigid, coriaceous, downy or strigillose on the rachis above, the rest quite glabrous, if we except the long hairs among the capsules. The pinnules are 6—8 inches in length, finely acuminated, the segments nearly an inch long, narrow, much falcated, the margins a good deal recurved, the whole underside, except at the apex, crowded with the fulvous sori.

19. A. *Poeppigii*, Hook.; glabrous except the rachis above, pinnæ closely pinnated, pinnules elongated sessile oblong-lanceolate much and suddenly acuminated pinnatifid nearly to the costa, segments thick and coriaceous crowded narrow-oblong falcate very obtuse densely clothed with sori to the very apex almost to the extremity of the acuminations, the margins slightly reflexed, bullate scales none, copious hairs among the capsules.—A. villosa, *Kze. Syn. Pl. Crypt. Poep. p.* 99 (*according to an authentic specimen of Poeppig in Herb. nostr.*), *excluding the synonyms.*

Hab. Peru, 1829, *Poeppig in Herb. nostr.* — This plant, although called *A. villosa* by Kunze in the Synopsis of S. American Cryptogamiæ, has nothing to do with the *Cyathea villosa*, H. B. K., which is adduced as a synonym. The species is more nearly allied to, though quite different from, *A. armata.* My solitary specimen does not show whether the stipes is aculeated or not. The rachis is glabrous, except above. Pinnules wholly glabrous above, the segments very close compact and regular, much broader and stouter and blunter than in our *A. elongata*, and not the smallest portion of them is destitute of sori. The long apex is so suddenly acuminated, that the pinnules might be called caudate.

20. A. *villosa*, (Kze.?) Presl; stipes unarmed or only beset with small dark elevated points, fronds tripinnate glabrous above clothed beneath (and on both sides in the young state)

with a more or less copious and lax tomentum, pinnæ nearly erect ovate (in circumscription) acuminate, pinnules oblong-lanceolate gradually acuminated more or less pinnatifid coriaceous, the segments oblong obtuse entire or coarsely serrated, veins twice or thrice forked of the same color and texture beneath as the frond, sori in 2 series rather distant on each side the costa, receptacle slightly elevated, hairs among the capsules long woolly. A. villosa, *Kze.** Cyathea villosa, *H. B. K. Nov. Gen. Am. v.* i. *p.* 24, *and v.* vii. *t.* 670; *Willd. Sp. Pl. v.* v. *p.* 495. Chnóophora Humboldtii, *Kaulf. En. Fil. p.* 250. —Als. tomentosa, *Presl, according to Klotzsch in Herb. Reg. Berol.* A. humilis, *J. Sm. Gen. Fil.*

Hab. Near Caripe, Santa Cruz and Guardia San Augustin, Missions of Chaymas, Caraccas, *Humboldt and Bonpland.* Caraccas, *Linden.* Brazil, near Moro Velho, *n.* 5334, and Serra do Frio, *n.* 5332, *Gardner.* S. Brazil, *Sellow.*—This species is extremely well figured by Humboldt in the work above quoted, and is indeed a very remarkable one, with a habit in many respects considerably different from that of other *Alsophilæ.* The pinnæ and pinnules do not spread at almost right angles from the rachis, which is common in the present genus, but point upwards. It is more divided, so as to be at least tripinnate. The whole plant, too, especially in a young state, is clothed with lax, deciduous, cobwebby hairs.

21. A. *plagiopteris,* Mart.; "fronds bipinnato-partite, stipes aculeate, partial rachis and veins downy above, scales on the veins few and deciduous, pinnæ linear-oblong acuminate, pinnules linear much acuminated and pinnatifid, segments between the rather broad sinuses lanceolate falcate toothed at the apex, the fertile ones nearly entire, the sterile serrated, in each pinnule the lowest and shorter segment is obliquely adnate with the rachis, sori upon the entire segments from 8—16." *Martius, Pl. Crypt. Bras. p.* 73, *t.* 50.

Hab. Brazil; Province of St. Paul, *Martius.* South Brazil, *Sellow.*—My own specimen of this, from the Royal Berlin Herbarium, quite coincides with the figure and description of Martius.

22. A. *paleolata,* Mart.; "frond bipinnato-partite, on both sides but especially beneath pubescent, the veins and veinlets beneath densely clothed with ovate white scales, stipes and rachis aculeate, common and partial rachis and veins strigillose above, pinnæ linear-oblong shortly acuminated, pinnules linear shortly acuminated pinnatifid, the apex serrated, the segments linear-oblong subfalcate toothed in the upper margin, the ultimate ones confluent so as to form serrated pinnæ, sori in the lower part of the segments 4—8

* In *Syn. Pl. Crypt. Poep.* But it is a question if it ought to be referred here, or to the preceding very different species: and Kunze quotes both of these under his *Alsophila villosa.*

arranged in 2 rows." *Mart. Pl. Crypt. Bras. p.* 68, *t.* 43. Polypodium Alsophilum, *Link.* Als. munita, *Presl.*

Hab. Brazil; Province of St. Paul, St. Sebastian and Bahia, *Martius.* — Dr. Martius compares this with *A. armata* (our *A. ferox*), from which it appears to me very distinct. Presl calls this *Als. munita*, Kaulf., but I know not upon what authority; for it is a species I find nowhere described.

23. A. *hirsuta*, Kaulf.; "frond tripinnatifido-partite slightly hairy on both sides especially beneath, and there furnished with little scales, stipes and rachis aculeate beneath, and as well as the partial rachis rough with hairs, pinnæ linear-oblong shortly acuminate deeply pinnatifid, segments broadly lanceolate inciso-semipinnatifid, the ultimate segments obliquely ovate acutely serrate above, sori in each segment 8—16." A. hirta, *Kaulf. En. Fil. p.* 249. *Martius, Pl. Crypt. Bras. p.* 69, *t.* 44. Cyathea hirsuta, *Presl.* Polypodium axillare, *Raddi, Fil. Bras. p.* 27, *t.* 41.

Hab. Brazil; Province of St. Sebastian, *Martius.* Rio Janeiro, *Raddi.* —Gaudichaud has adduced the *Polypodium axillare*, Raddi, as a synonym to this plant, and probably correctly.

24. A. *rigidula*, Mart.; "frond bipinnato-partite rather firm ovato-rhomboid flocculoso-pubescent especially beneath, stipes clothed at the base with long whitish ciliated scales and as well as the rachis aculeolate nodulose slightly hairy above in the middle, pinnules lanceolate rather obtuse at the base on the lower margin subdecurrent pinnatifid and crenate, the ultimate confluent into a serrated acumen, sori 2—4—6 in each segment." *Martius, Pl. Crypt. Bras. p.* 74, *t.* 51.

Hab. Woods, Province of St. Paul, Brazil, *Martius.*

25. A. *nigra*, Mart.; "frond bipinnato-partite slightly hairy the hairs spreading, scales none, stipes and rachis aculeate, partial rachis and veins hairy, pinnæ linear-oblong acuminate, pinnules linear acuminate pinnatifid, segments between the rather acute sinuses linear-oblong obtuse crenato-dentate in the superior margin, sori 8—10 covering the whole segments." *Martius, Pl. Crypt. Bras. p.* 71, *t.* 47.

Hab. Province of Rio Negro, Brazil, *Martius.*

26. A. *monticola*, Mart.; "frond bipinnato-partite, rachis and nerves villous below and above villoso-tomentose, the rest of the plant nearly glabrous above downy beneath, pinnæ and pinnules oblongo-lanceolate acuminate, segments of the posterior pinnæ linear-oblong pinnatifido-serrate, the serratures acute nearly entire, sori 6—10 on the segments, segments of the superior pinnæ toothed with the sori nearly solitary." *Martius, Pl. Crypt. Bras. p.* 75.

Hab. Brazil. Province of Minas Geraes, Villa Rica, Brazil, *Freireiss (in Martius)*.

27. A. *Sprengeliana*, Mart.; "frond bipinnato-partite, stipes aculeate and as well as the rachis and veins sparingly downy, pinnæ oblongo-lanceolate acuminate, pinnules linear-oblong much cuspidate, segments between the rather acute sinuses obliquely linear-oblong rather obtuse denticulate on the superior margin, the lower posterior segment of each pinnule shorter but not decurrent, sori 8—10 occupying the whole segment." *Martius, Pl. Crypt. Bras. p.* 75. "Cyathea armata, *Spreng. in Herb. Bertero.*"

Hab. San Domingo and Guadeloupe, *Bertero*.

28. A. *atrovirens*, Presl; "fronds compound, pinnæ pinnate subpetiolate, pinnules sessile broadly lanceolate coarsely and pinnatifidly dentato-serrate denticulate, sori scattered or arising from an hemispherical receptacle, stipes with short spines (arborescent)." Polypodium atrovirens, *Langsd. et Fischer, Fil. Bras. p.* 12, *t.* 14. *Willd. Sp. Pl. v.* v. *p.* 188.

Hab. St. Catherine's, Brazil, *Langsdorff.*—This is, no doubt, as Presl has rightly judged, an *Alsophila*: and, so far as can be inferred from the figure, nearly allied to *A. procera*, or perhaps *A. Hookeriana*.

29. A. *radens*, Kaulf.; "fronds bipinnate, pinnules linear-lanceolate pinnatifid, segments oblong obtuse nearly entire, rachis aculeate beneath, costa paleaceous." *Kaulf. En. Fil. p.* 248.

Hab. Brazil, *Chamisso.*—"Pinnæ about 2 feet long; pinnules 1½—2 inches. Sori minute, globose, inserted upon the receptacle, parallel with the costa of the segments and arising from the middle of the veinlets. Involucres scarcely any."

30. A. *setosa*, Kaulf.; "fronds tripinnate, secondary pinnæ lanceolate acuminate pinnated at the base glaucous beneath, pinnules linear subfalcate toothed at the apex, partial rachis flexuose setose above, costulæ beneath with chaffy ciliated scales." *Kaulf. Enum. Fil. p.* 249.

Hab. Brazil, *Chamisso.*—"Plant very large. The specimens which I have examined have the general rachis about as thick as the little finger, rather rough; the primary pinnæ more than 1 foot long, secondary 3—4 inches; sori globose covered with a very thin, torn, reclinate involucre, of which from 8—10 are inserted on each pinnule," (segment). — It is singular that with so evident an involucre as he describes, Kaulfuss should not have referred this Fern to *Cyathea*.

31. A. *pycnocarpa*, Kze.; "frond bipinnate, pinnæ alternate petiolate, petioles thickened at the base, pinnules subsessile lanceolate crenato-serrate or subincised, the apex obtuse subfalcate entire, sori clustered on the segments, ra-

chis flexuose angled and as well as the stipes aculeate with white chaffy scales above." *Kunze, Syn. Pl. Crypt. Poepp. p.* 97.

Hab. Woods of Pampay, near Peru, *Poeppig.*

32. A. *subaculeata*, Splitg.; "frond bipinnate, pinnæ alternate nearly glabrous, pinnules lanceolate acuminate pinnatifid segments oblong obtuse dentate, rachis and stipes subaculeate." *Splitg. Enum. Fil. Surin.*

Hab. Surinam, *Splitgerber.*—The above brief character is not calculated to throw light on the species here intended, nor can much more be learned from the full description. The author compares it with *Als. nigra*, Mart. (*n.* 25 of this work).

33. A. *pilosa*, Martius et Galeotti; "fronds ample pilose ovato-lanceolate sub-bipinnate, pinnæ patent lanceolate elongate much acuminate deeply pinnatifid, upper ones gradually smaller, segments linear oblong obtuse toothed at the apex, the margins revolute glabrous above, veins parallel, the rachis and costa hairy beneath, sori globose crowded submarginal pilose, stipes and common rachis hairy." *Martius et Galeotti, Syn. Fil. Mex. p.* 78, *t.* 22.

Hab. Mexico; Totutla, Colony of Mirador, at an elevation of 4000 feet above the level of the sea, *Galeotti, n.* 6405.—"Frond 4—6 feet. Pinnæ 2—10 inches; the lower ones a foot long, segments half an inch to an inch long."—It is impossible from such a description and from such a figure to offer an opinion on the affinities of this species. The veins are represented as quite simple, parallel and nearly horizontal, and the sori, although stated to be globose, are oblong in the plate.

34. A. *Mexicana*, Mart.; "frond tripinnatifido-partite sparingly hirsute on both sides, stipes and rachis rough with hairs and furnished with deciduous scales varying in size, pinnæ linear-oblong acute, pinnules linear acuminate deeply pinnatifid, ultimate segments obliquely and broadly ovate entire or emarginato-bidentate, sori on each segment near the rachis 2—8." *Mart. Pl. Crypt. Bras. p.* 70, *t.* 45.

Hab. Mexico, Province of Oaxaca, *Karwinski.*

35. A. *pruinata*, Kaulf.; fronds bipinnate glaucous beneath rigid woolly upon the rachis, pinnules lanceolate (small) deeply pinnatifid, segments ovato-lanceolate very acute sinuato-serrate, veins simple, sorus solitary at the base of each segment, capsules mixed with copious hairs. — Polypodium pruinatum, *Sw. Fl. Ind. Occ. v.* iii. *p.* 1682. P. glaucum, *Sw. Prodr. p.* 134. P. cinereum, *Cavan.* P. griseum, *Schkuhr, Fil. t.* 25. Cyathea discolor, *Bory, in Duperrey's Voy. Crypt. p.* 281.

Hab. Jamaica, abundant, *Swartz and others.* Mexico, *Linden, n.* 18,

Galeotti, n. 6334. Chili, frequent: Conception, *Cuming, n.* 153. Valdivia, *Bridges, n.* 814, *Mr. Reynolds.* Juan Fernandez, *Bertero, n.* 1553, *Douglas.* —This is said to have a stem from 3—6 or 8 feet high, and which Mr. Douglas compares to a small pine-tree, leafy at the top. The stipes is quite smooth, the underside of the frond singularly glaucous, equally so with the *Cyathea dealbata* of New Zealand; the pinnules are extremely numerous, small, not exceeding 1—1½ inch in length, but the pinnæ are ample. In habit and appearance this is extremely distinct from any other *Alsophila*, and the receptacles are very slightly elevated; so that it must be considered but a doubtful species of the genus.

Dubious Species of the West Indies, Mexico and South America.

36. A. *Dombeyi*, Desv.; "fronds glabrous, pinnules sessile elongato-lanceolate acute slightly pinnatifid, segments obtuse nearly entire oblong, sori near the costa, rachis unarmed." *Desv. Prodr. Fil. in Mém. Soc. Linn. v.* ii. *p.* 320. Peru.— "Pinnules resembling those of *A. aspera*, but the sori differently placed. Involucre unknown." *Desv.*

37. A. *Millefolium*, Desv.; "fronds decompound subquadrifido-pinnate, pinnules dilated at the base acuminato-attenuate at the apex, shortly petiolate pinnate, lowest pinnulets petiolate deeply pinnatifid alately adnate, segments elongato-triangular, involucres lacerato-crinite, rachis glabrous unarmed above pulverulently pubescent." *Desv. l. c. p.* 320.— Hispaniola. Desvaux makes no further remark, except to adduce as a synonym the "Filix aurea ramosa, etc., *Plum. Fil. p.* 26, *t.* 33."

38. A. *Schiedeana*, Presl; "fronds bipinnate, pinnæ deeply pinnatifid. Arboreous, aculeate, nearly allied to *Polypodium* (*Alsophila*) *pròcerum*, Willd., from which it differs in the aculei, in the pinnules being more deeply pinnatifid, and the segments nearly entire. — Also allied to *Pol. pungens*, Willd. (*Alsophila*, Kaulf.), from which again it differs in the pinnules being shortly acuminate, more deeply pinnatifid, the segments broader obtuse slightly dilated at the apex; and in the sori not being contiguous." *Schlect. in Linnæa, v.* iii. *p.* 609. Huitamalco and Cuapa, Mexico, (*DeCandolle*).

39. A. *Martinicensis*, Sprengel, Syst. Veget. iv. p. 124.— "Frond pubescent, pinnules lanceolate pinnatifid acuminate entire at the apex, segments oblong obtuse crenate, rachis and stipes hairy. Martinique."—This seems to be taken up from Sieber's published specimens of Martinique Ferns, where a species is given under that name. But if so, it is probably rather a Polypodiaceous plant.

A. *Perinniana*, Spreng. l. c. p. 125, is the same as *Woodsia Perinniana*, Hook. et Grev.

40. A. (Gymnosphæra, *J. Sm.*) *aculeata*, J. Sm., Gen. Fil. *name only*.—Trinidad.

41. A. *speciosa*, Presl, Pterid. p. 62. Under this name Presl refers to "*Polypodium speciosum*, Meyen, St. i. p. 108."—S. America?

A. *strigosa*, J. Sm., Gen. Fil. (name only), from British Guiana, "*Schomburgk, n.* 304," the author is disposed to consider the same as *Hemitelia Hostmanni*, supra, p. 31.

A. *serrata*, J. Sm., Gen. Fil. (name only), from Jamaica, Mr. Smith considers probably a var. of *A. aspera*.

A. *Tumacensis*, J. Sm., Gen. Fil. (name only), is *A. elongata*, supra, p. 43, n. 18; to which may be added Island of Tumaca, Central America, *Barclay*.

A. *lævis*, J. Sm., Gen. Fil. (name only), is *Hemitelia Guianensis*, Hook. supra, p. 31, n. 8.

A. *tenera*, J. Sm., Gen. Fil. (name only).—St. Vincent's, *Caley*. A portion of this, now before me, consisting of a pinna with a part of the main rachis, is unarmed and every where glabrous, except a few rather long scattered hairs on the veins above and closely appressed shorter ones on the rachis above. Pinnules about 3 inches long, broad lanceolate, thin and very membranaceous, deeply pinnatifid almost to the base, shortly acuminated into a narrow serrated point; segments oblong, obtuse, slightly falcate, serrated, lower veins forked, with the sori in the forks. The capsules have mostly fallen away, still there remains a shallow cup-shaped involucre much broken at the margin, but so large and so entirely surrounding the receptacle that I should have no hesitation in referring the plant to *Cyathea*. Its very tender frond may be the consequence of growing in a shady situation.

A. *brevis*, J. Sm., Gen. Fil. (name only). This Mr. Smith now considers may be a *Polypodium*.

*** Species of the South Sea Islands and Australia.*

42. A. *excelsa*, *Br.*; stipes and main rachis muricated, rachis when young especially beneath clothed with chaffy scales frequently mixed with wool, fronds bipinnate, pinnules oblong-lanceolate acuminated, segments oblong rather acute serrated at length coriaceous with the margins reflexed, lower ones subauriculate at the base free and even slightly petiolated, the lower half or sometimes the whole segments bearing sori, veins often twice or thrice forked, capsules mixed with hairs, involucre nearly obsolete a thin minute irregular mem-

brane beneath the sorus which entirely conceals it. (TAB. XVIII. A.) A. excelsa, *Br. Prodr.* (*note*) *p.* 158. *Endlicher, Prodr. Fl. Norf. Isl. p.* 16. *Backhouse, Austral. Voy. plate at p.* 265, (*group of trees with* A. excelsa).

Hab. Norfolk Island, *Ferd. Bauer, A. Cunningham, Backhouse.* — Although there may be more lofty species of Tree Ferns in the East Indies, the present one is not undeserving the name of *excelsa*. This appellation has been universally attributed to Mr. Brown, by whom the plant was perhaps first noticed in print, and who referred it to the genus *Alsophila*; yet it appears to me that by the expression "necnon plures ineditæ ab India utraque et una excelsa Insulæ Norfolciæ," he merely intended a *lofty species* of Norfolk Island; there being already a *Cyathea excelsa*, and indeed an *Alsophila excelsa* of Martius (our *A. Tænitis*). Lieut. King* says of this noble Fern, "It grows to the height of 80 feet, and the branches (fronds) which resemble the palm-tree, fall off every year, leaving an indentation on the trunk. The middle of the tree, from the root to the apex, consists of a white substance resembling a yam, and when boiled it tastes like a bad turnep: this the hogs feed on greedily. It is found in great plenty all over the island." Mr. Cunningham measured a trunk which he felled in 1830, which was 57 feet in length without the fronds. Mr. Backhouse measured the stems "40 feet high, crowned with magnificent circular crests of fronds." Endlicher's description of this noble Fern is very full and accurate.

43. A. *australis*, Br.; glabrous, stipes aculeated? fronds bipinnate, pinnules (rather small 2—4 inches) linear-lanceolate acuminate deeply pinnatifid paler somewhat glaucous beneath, segments ovate acute entire or slightly serrated, bullate scales none, sori from 1—4 occupying the lower part of the segment, veins simple and forked, capsules mixed with a few hairs. (TAB. XIX. A.) *Br. Prodr. p.* 158. *Sieb. Syn. Fil. n.* 122. *Fl. Mixt. n.* 241.

Hab. N. S. Wales. Port Jackson and Tasmania, *R. Brown*. Macquarrie Harbour, Tasmania, *Backhouse*. — Probably a rare species. The only specimens I am so fortunate as to possess, are amongst Sieber's collections. Mr. Backhouse, in his interesting Australian Voyage, speaking of Philip's Island, Macquarrie Harbour, Tasmania, says, "We walked over the island and along one of its sides, which was woody and which exhibited the finest Tree Ferns we had yet seen, and in great profusion. They were of two kinds, one of which we did not meet with elsewhere (*Alsophila australis*). Some of the larger fronds or leaves were 13 feet long, making the diameter of the crest 26 feet. The stems were of all degrees of elevation up to 25 or 30 feet: some of them, at the lower part, were as stout as a man's body: those of *Cibotium Billardieri* were covered with roots on the outside: the whole length of those of the other species, *Alsophila australis*, were clothed with the bases of old leaves, which were rough, like the stems of raspberries, closely tiled over each other and pointing upwards." — In our dried specimens the upper side of the frond is dark green, almost black, pale and

* See Memoir of the late Allan Cunningham, Esq., by Mr. Heward, in Hooker's Lond. Journ. of Botany, vol. i. p. 122 (note).

somewhat glaucous beneath: the main rachis light brown, the veins dark-colored, simple, except a few at the base of the segment, which are frequently forked and bear the sori.

44. A. *lunulata*, Br.; "fronds bipinnate, pinnæ at the apex serrated setaceous, the segments linear-oblong falcate serrated at the apex, stipes rough." Polypodium lunulatum, *Forst. Prodr. Fl. Ins. Austr. p.* 83.

Hab. South-Sea Islands, *Forster.*—Of this plant I know nothing. Mr. J. Smith, in his *Enum. Fil. Ins. Philipp.*, supposes his *A. caudata*, from Luçon (*Cuming, n.* 267) may be the same. See Hook. Journ. of Bot. v. iii. p. 419.

45. A. *decurrens*, Hook.; unarmed? nearly glabrous, fronds tripinnate, pinnules small (an inch long) sessile pinnatifid membranaceous obtuse with a few bullate scales and hairs beneath, segments ovate acute entire or slightly serrated the lower one adnate with the rachis and decurrent, veins simple or forked, sori one on each segment, receptacle elevated destitute of hairs. Cyathea extensa? *Hook. in Nightingale's Voy. App.*

Hab. South-Sea Islands, *Nightingale.* — A very distinct species, which I place in *Alsophila*, on account of the elevated receptacle and the presence of bullate scales. The pinnules are the smallest of any species I am acquainted with, delicate, membranaceous, pinnatifid about half-way down to the rachis, the lowest exterior segment adnate with the rachis, and decurrent along its side.

**** Species from the East Indies, Malay Islands and Ladrones.*

46. A. (Gymnosphæra) *glabra*, Bl.; "frond bipinnate, pinnules lanceolate sharply serrated at the apex, the base truncate slightly pinnatifid glabrous, segments rotundate obtuse crenulate." Gymnosphæra glabra, *Blume, En. Fil. Jav. p.* 242.

Hab. Lofty mountains of Java, *Blume.* — The above is the description given of this plant by Blume, which, together with *A. squamulata*, he refers to his genus *Gymnosphæra*, on account of the sori being inserted on the middle of the vein; — a very inconstant character.

47. A. ("Gymnosphæra") *squamulata*, Bl.; frond bipinnate, partial rachis slightly squamose, pinnules all petiolate, sterile ones oblong-lanceolate, fertile portions contracted coriaceous glossy as if varnished ending in an acuminated serrulated point pinnatifid scarcely half way down to the rachis, segments ovate obtuse serrate, the margins thickened or very slightly recurved, veins simple, sori frequently confined to the lower part of the pinnules and placed close to the costa of the segments.—*Bl. En. Fil. Jav. p.* 243. *J. Sm. En. Fil. Philipp. in Hook. Journ. of Bot. v.* iii. *p.* 419. *Hook. Gen. Fil. t.* 100.

Hab. Java, *Blume.* Malacca, *Cuming, n.* 396. — A very well marked

species, but the description of Blume is too short to be satisfactory; though I have followed Mr. J. Smith in considering our plant the same. The main rachis is of a rich chestnut brown color; the principal pinnules have a distinct petiole, a line or a line and a half long: the texture is coriaceous, the surface singularly glossy, with the veins having the same appearance as to color and surface as the frond. Fructifications dark brown, sometimes occupying the greater part of the pinnule, which is then contracted, or confined to the lower segments, when they become contracted so that the broadest part is above the middle. A few minute dark brown bullate scales are seen on the costa. Veins simple.

48. A. *contaminans*, Wall.; aculeolate, frond bipinnate coriaceous glaucous beneath, pinnules oblong-lanceolate acuminate deeply pinnatifid, segments oblong falcate the fertile ones narrower rather obtuse crenulate, sori upon forked veins in lines parallel with the costa and covering nearly the whole segment, capsules mixed with hairs. (TAB. XVIII. B.) A. contaminans, *Wall. Cat. in Index.* Polypodium contaminans, *Wall. in Herb.* 1823, *Cat. n.* 320. Chnoophora glauca, *Blume, En. Fil. Jav. p.* 243. Alsophila glauca, *J. Sm.* —*β.* segments more elongated and acuminated.

Hab. Penang, *Dr. Wallich.* Java and Molucca, *Millett and Blume.* Luçon, *Cuming, n.* 71. South Camarines, *Cuming, n.* 291. — *β.* Isle Negros, Philippine Islands, *Cuming, n.* 345.—A well marked species, with rather rigid coriaceous fronds, becoming very dark colored in drying, but always retaining their glaucous hue beneath. The stipes is muricated with very short sharp points, and the same extend to the main rachis and to that of the pinnæ, in this respect resembling the *A. excelsa.* I retain the name of its first discoverer, Dr. Wallich, by whom it has been extensively distributed. Blume thinks it probable it may be the *Cyathea glauca* of Bory.

49. A. *caudata*, J. Sm.; unarmed, frond bipinnate glabrous, pinnules sessile oblong-lanceolate broadest at the base the apex suddenly contracted into a long narrow serrated tail-like acumen coriaceo-membranaceous paler and slightly glaucous beneath, the segments oblong a little falcate rather obtuse serrated, veins simple or more generally forked, bullate scales none, sori close to the midrib, occupying the lower part of the segments. (TAB. XX. B.) *J. Sm. in En. Fil. Philipp.* (*name only*).

Hab. Manilla, Luçon, *Cuming, n.* 267.—The most marked character about this plant is the sudden contraction of its pinnule into a long tail-like point. The general form of the pinnules and segments approaches those of *Als. contaminans*, but the under surface is scarcely glaucous. Mr. J. Smith thinks this species may not be different from *A. lunulata*, our n. 44.

50. A. *Brunoniana*, Wall.; unarmed, fronds bipinnate pinnules lanceolate acuminate deeply pinnatifid coriaceous glaucous beneath, veins once or twice forked, bullate scales none, margin recurved entire or crenulate, sori in two rows

occupying the greater part of the segments.—A. Brunoniana, *Wall. Cat. n.* 7073.

Hab. Mountains of Sylhet, *Dr. Wallich.* — Neither in my own rich collection of East-Indian Ferns from Dr. Wallich, nor in the still more extensive one which exists in the herbarium of the Linnean Society, derived from the same source, is there any specimen under this name. There is, however, an enormous trunk (caudex) of this Fern, 45 feet long, deposited in the British Museum, by Dr. Wallich: and from some withered remains on the summit of its caudex, the above imperfect character is drawn up. It would appear to be very closely allied to the *A. contaminans* above described, but the stipes and rachis do not seem at all muricated. The pinnules also approach very nearly some states of *A. gigantea.*

51. A. *gigantea*, Wall.; unarmed, fronds bi-tripinnate, pinnæ ovato-lanceolate submembranaceous opaque (not glossy), pinnules oblong-lanceolate subpetiolate acuminate pinnatifid to various depths, the uppermost pinnules united into an acuminated pinnatifid apex, segments ovate more or less broad slightly falcate serrated, upper side of the rachis strigose, costæ without scales or with a few minute deciduous ones, veins simple, sori in two rows placed half way between the margin and costa, receptacle elevated without hairs. Polypodium giganteum, *Wall. Herb.* 1823, *Cat. n.* 321. Gymnosphæra gigantea, *J. Sm. Gen. Fil.* Polypodium altissimum, *Wall. in Herb.* 1820. Cyathea venulosa, *Wall. Cat. n.* 180. Alsophila venulosa, *Wall. Cat. in Index.* Polypodium? umbrosum, *Wall. Cat. n.* 336.

Hab. Sylhet. Nepaul. Mountains of Tenasserim, *Wallich.* Ceylon, *Mrs. Walker, n.* 1919. Penang, *Dr. Wallich, Lady Dalhousie.* Java, *Millett.*—Caudex gigantic, 50 feet high (*Wall.*) Fronds simple, but so variable in the form and size of the pinnules in our copious specimens, that it is scarcely possible to define them in words. I find no tubercles or aculei on the stipes or rachis. The pinnules are remote on the lower part of the main rachis, gradually becoming closer upwards, till they unite and terminate in a long, pinnatifid, acuminated point. Pinnules on some specimens 2—4 inches long, half an inch broad: in others 6 inches long and 1 inch broad: segments varying much in length and in the depth of the sinus, all of them slightly falcate, serrated, the veins almost invariably simple; lines of fructification in two rows, occupying nearly the whole length of the segment between the margin and costa. The texture of the frond is rather thin, not approaching to coriaceous; the color very dark in drying.—It is a trunk of this species which forms so conspicuous an object on the stair-case of the apartments of the Linnean Society of London.

52. A. *comosa*, Wall.; unarmed, stipes densely clothed with long chaffy pale brown deciduous scales, rachis strigose or almost setose above, fronds bipinnate, pinnæ united towards the apex so as to be there pinnatifid, pinnules sessile or nearly so oblong-lanceolate moderately acuminated submembranaceous pinnatifid about two-thirds of the way down, segments

ovate slightly falcate obtuse, veins generally forked, bullate scales none, receptacles small slightly elevated. (Tab. XX. A.) A. comosa, *Wall. Cat. n.* 319.—*β.* pinnules more deeply pinnatifid, segments narrower, veins oftener once or twice forked, scales of the stipes more permanent.

Hab. Singapore, *Wallich.* Java, *Millett.*—*β.* Ceylon, *Mrs. Gen. Walker.* In many respects this resembles the preceding, *A. gigantea ;* but it is more delicate in texture, paler in color, the veins mostly forked, the receptacles less elevated.—The var. *β.* may be a distinct species; yet I can discover no tangible differences except the above, to which may be added that the fronds are of a rather firmer and more coriaceous texture.

53. A. *crinita*, Hook.; stipes and main flexuose rachis pale colored rough with minute points and muricated with very short black spines, fronds bipinnate coriaceous, rachis everywhere hairy above beneath clothed as well as the costa with ciliated scales some short and minute the majority very long slender appressed resembling coarse shaggy hair, pinnules sessile narrow-lanceolate gradually tapering into a very slender point deeply pinnatifid almost to the rachis, segments narrow ovate oblong rather obtuse falcate the margin (when dry) strongly recurved, paler beneath where the costa and even the veins are often hairy, veins forked, sori occupying nearly the whole length and breadth of the segments and in a measure covered by the crinite scales. *Hook. Ic. Pl. t.* 671.

Hab. Ceylon, *Mrs. General Walker, n.* 34 *and* 41.—A very remarkable species, not like any other that I am acquainted with. It has the dark minute tuberculations on a pale stipes and main rachis, which I have described on *Cyathea medullaris.* The main rachis too, and the rachis of the pinnæ, although stout, are waved or flexuose: and they are beneath quite shaggy with copious scales; these are of two kinds, at least upon the main rachis, some of them being exceedingly small, but the majority are long, slender, subulate, more or less appressed, gradually smaller on the costæ, where they partially cover and conceal the copious fructifications.

54. A. *lepifera*, J. Sm.; main rachis studded with dark shining prominent points or tubercles scarcely aculeated, fronds bipinnate, pinnules sessile broadest at the base narrow-lanceolate tapering into a very long slender subulate point, segments linear-oblong falcate rather obtuse somewhat glaucous beneath, costa below with a few flattish pale-colored scales, the fertile rather contracted and the margin a little recurved, veins forked, sori occupying the whole underside of the segments. A. lepifera, *J. Sm. in En. Fil. Philip.* (*name only*).

Hab. South Camarines, *Cuming.*—The lower portion of the main rachis is studded like the preceding with prominent black shining points; the upper portion is clothed with long appressed coarsish hairs, both have a few long, slender, crinite scales, which induce me to think the plant may be an old state of the preceding, from which the scales have fallen. The shape

of the pinnules is not different; they are less coriaceous, and the underside is slightly glaucous.

55. A.? (Chnoophora) *tomentosa*, Bl.; "arborescent unarmed, frond bipinnate coriaceous densely clothed beneath with fulvous tomentum, pinnules lanceolate acuminate deeply pinnatifid, the segments linear obtuse nearly straight the margin slightly crenulate and revolute, common rachis tomentose whitish above paleaceous beneath," *Bl.* Chnoophora? tomentosa, *Bl. En. Fil. Jav. p.* 244.

Hab. Woods on the lofty mountains of Gede, Java, *Blume.*

56. A. (Chnoophora) *lurida*, Bl.; "arborescent unarmed, frond bipinnate coriaceous, costæ beneath and the secondary rachis paleaceo-hirsute, pinnules lanceolate acuminate deeply pinnatifid the segments linear subfalcate obtuse crenulate recurved at the margin, common rachis shining above hairy beneath." Chnoophora lurida, *Bl. En. Fil. Jav. p.* 244.

Hab. Mountain woods of Java and Celebes, *Blume.*

57. A. *Hænkei*, Pr.; "fronds triplicato-pinnate, secondary pinnæ sessile linear cuspidate acuminate, pinnules oblong obtuse subfalcate serrulate, stipes and primary and secondary rachis muricated, tertiary paleaceo-hirsute, costæ scaly beneath." *Presl, Reliq. Hænk. v.* i. *p.* 68. A. Marianna, *Gaud. in Freyc. Voy. Bot. p.* 365. "Cyathea Marianna, *Gaud. M.S et Gen. p.* 74," (Freyc.)

Hab. Marianne Islands (Guam), *Hænke, Gaudichaud.*— Of this I know nothing, nor can much be learned from the more full description given by Gaudichaud. Although Presl himself adduces *A. Marianna* as a synonym of *A. Hænkei*, I cannot but feel doubtful on the point. Presl describes his plant with an "Indusium planum lacero-multifidum," and he speaks of it as allied to *Pol. lunulatum*, Forst., and *Cyathea extensa*, Sw. Gaudichaud also quotes, though doubtfully, *Cyathea extensa*, Schkuhr, Fil. p. 127, t. 132, not even excluding the figures D, E, and F, where the fructification is truly the cup of a *Cyathea.*

Doubtful Species of the East Indies.

58. A. *Manillensis*, Presl, in Mey. Herb. (v. Presl, Tent. Pterid. p. 62).

59. A. *Wallichiana*, Presl, Tent. Pterid. p. 62. "Polypodium e Silhet Mountains," *Pr.*

60. A. *glaucescens*, Wall. Cat. n. 7074. Mountains of Sylhet, *W. Gomez.* "Allied to *A. Brunoniana*, Wall. (supra, p. 52, n. 50).

61. A. *Grevilleana*, Wall. Cat. n. 7075. Mountains of Sylhet, *W. Gomez.*

62. A. *Telfairiana*, Wall. in Index. Aspidium Telfairianum, *Wall. Cat. n.* 385. Mauritius, *Mr. Telfair.* — Of this and the two preceding species I have seen no specimens.

Doubtful Species; country unknown.

63. A. *Wiegeltii*, Roem. Herb. Presl, Pterid. p. 61, (name only).

Tribe II. DICKSONIEÆ, *Gaud.*

Sori globose or subcylindrical, situated upon the back (Woodsieæ) or at the apex of a vein or veinlet (Eudicksonieæ) or at the confluent angle of reticulated veins (Hypoderrideæ). *Involucre* inferior (having its origin from beneath) globose or cylindrical, free, sometimes covering the whole sorus, closed at the top, at length bursting at the summit; more frequently cup-shaped, open at the mouth, the margin entire or 2-lipped, naked or fimbriated or crinite, wholly or in part formed of the substance of the frond, or more membranaceous: sometimes it constitutes a shallow, very indistinct, fringed cup, of which the membranaceous portion is so small as to be concealed by the capsules, never wholly wanting.—*Tufted or creeping* Ferns, *generally small, rarely arborescent, inhabiting various climates, from the extreme Arctic regions to the Tropics.*

Obs. It has been found, I believe, by all botanists to be far more difficult to divide the several groups of Cryptogamic plants into natural and tangible sections, than the so-called higher orders of Phænogamous plants. They are seen to pass so insensibly, the one into the other, and to be connected by so many different links, that it is next to impossible to define them by words, and in vain to expect that the several individuals who study them should arrive at the same conclusion in regard to their respective limits, artificial though, in a linear series, they must still, in a measure, necessarily be. The several genera, for example, which I here bring under one group or Tribe, others have, with perhaps equal justice, thought worthy of being broken down into at least three separate ones, *Peranemaceæ*, *Dicksonieæ*, and *Hymenophylleæ*. Nay, with regard to the last-mentioned group, Presl has not deemed it right to include it in the true Filices at all. The Tribe *Dicksonieæ* is here intended to embrace those Ferns which have an involucre resembling, or approaching to those of *Cyatheæ*, but whose fronds exhibit a totally different aspect, rarely arborescent, never or very seldom aculeated, extremely variable in composition, and also, in texture, from the most delicate reticulated membrane to a firm coriaceous substance: with capsules generally subglobose, and stipitate with a moderately broad incomplete elastic vertical ring, rarely sessile and angularly compressed with a broad complete oblique ring; such forms as are common in *Cyatheæ*, (whence Presl constituted of them and of the *Gleicheniaceæ* the suborder *Helicogyratæ*), but which are by no means universal in *Cyatheæ;* and on the other hand we possess such capsules or analogous ones in *Loxsoma*, *Thyrsopteris* and in the Hymenophylleous genera of the present Tribe. It must be allowed indeed that the characters here derived from the fructifica-

tion, bring together plants very little allied by nature, for no Ferns can be more different, if habit be considered, than *Hypoderris* and *Trichomanes;* yet if the nature of the sori and of the involucre especially is of such primary importance as has generally been allowed, I have no other characters to offer, and none so simple, as the usually *free cup-shaped sometimes bifid involucre* of *Dicksonieæ*. *Loxsoma*, while it is closely allied in the form and structure of the involucre to *Trichomanes* on the one hand, on the other is the connecting link with *Davallieæ*.

SUBTRIBE I. *Sori on the junction of reticulated veins or veinlets.* HYPODERRIDEÆ.

1. HYPODERRIS, *Br.*

Sori dorsal, globose, inserted in lines or series, parallel with the primary veins upon the confluent angles of reticulated veinlets. *Involucre* inferior calyciform thin and membranaceous loosely reticulated, the margin spreading and fimbriated. *Capsules* nearly globose, stipitate, on a small punctiform receptacle. — *Native of* Trinidad. Frond *stipitate, simple, subcordato-hastate, acuminate, costate, pinnatedly veined, membranaceous;* veins *alternate, nearly parallel, flexuose;* primary veinlets *pinnated, the rest anastomosing, so that almost the whole surface has a reticulated venation.* HOOK. GEN. FIL. TAB. 1.

1. H. *Brownii. J. Sm. MS. in Hook. Gen. Fil. l. c. Hook. Ic. Pl. t.* 675, 676.

Hab. St. Anne's Valley, Trinidad, *Lockhart.*—Caudex creeping. Stipes from a span to a foot high, scaly. Frond longer than the stipes, ovate-lanceolate, acuminate, entire, membranaceous, glabrous, the base with rather a deep sinus, and on each side a short obtuse rounded lobe, or this is occasionally prolonged into two broadly lanceolate, sometimes acuminated, erecto-patent segments, 2—5 inches long. Costa strong, emitting a branch at the base to each auriculated segment; this costa is again regularly pinnated with strong, parallel veins, which are connected by slender transverse ones, sending off branches which form a nearly hexangular, delicate network over the whole surface. Several of the areolæ, especially near the strong lateral veins from the costa, are occupied by a free veinlet. Sori not very copious and always on the angle of united veinlets arranged in rather remote series on each side of the lateral veins just mentioned; and when more copious also on each side the primary transverse veinlets.

This rare plant was first noticed by Mr. Brown, who says, in Wallich's *Ic. Plant. Asiat. Rar.*, when speaking of *Matonia*, "the beautiful ramification of veins in *Matonia*, is not altogether peculiar to it. Among the genera of *Polypodiaceæ* having an indusium, one remarkable example occurs in a genus yet undescribed (*Hypoderris*), which, with an indusium not materially different from that of *Woodsia*, has exactly the habit of *Aspidium trifoliatum*, while of those genera of *Polypodiaceæ* which are without an indusium, the same kind of vascularity is found in an extensive and very natural section of *Polypodium*, to which *P. Phymatodes* and the greater number of those species, 'sori saccati' belong."—Mr. J. Smith places this genus in "*Aspidieæ*" between *Matonia* and *Aspidium*, Pr. although its involucre is

widely different from both. To the latter genus, as restricted by Presl and J. Smith, it is undoubtedly allied in its venation, while it is equally so with the *Phymatodes*-group of *Polypodium*. Considering as I do, that the primary divisions of Ferns should be taken as much as possible from the fructification, I have no hesitation in placing *Hypoderris* among the *Dicksonieæ*, and near to *Woodsia*, with which it bears the same relation that *Aspidium*, Presl, does to *Lastræa* in *Aspidieæ*; or *Phymatodes*, Presl, to *Polypodium*, under *Polypodiaceæ*.

I am indebted to Mr. Lockhart of Trinidad for fine specimens of this plant.

SUBTRIBE II. *Sorus on the back of a simple vein or veinlet.* WOODSIEÆ, (Peranemaceæ, *Pr.*)

2. SPHÆROPTERIS, *Wall.* (not *Bernh.*)

Peranema, *Don, Presl.*

Sori globose, on the back of a vein or veinlet. *Receptacle* elevated globose. *Involucre* inferior, globose, coriaceous, stalked, at first entire and covering the whole sorus, at length bursting rather irregularly and vertically at the top into 2 valves or lips. *Capsules* numerous, stipitate. — *Native of* Northern India. Rhizoma *large, globose; no distinct* caudex. Fronds *erect, stipitate* (stipes *and* rachis *chaffy*), *tripinnate*. Veins *simply pinnate, veinlets rarely forked, clavate at the apex within the margin, and glandular below the apex on the under side; lower anterior veinlet soriferous.* HOOK. GEN. FIL. TAB. 22.

1. S. *barbata*. *Wall. in Herb.* 1823; *Cat. n.* 183; *Pl. Asiat. Rar.* i. *p.* 42, *t.* 48. Peranema cyathoides, *Don, Prodr. Fl. Nep. p.* 12.

Hab. Nepal, *Wallich*, 1821. — Fronds 2—3 feet long, tripinnate; the base of the stipes densely clothed with long brown membranaceous acuminated scales; the main and partial rachis with fewer scattered smaller ones. Pinnules oval-oblong sessile, decurrent, so that the partial rachis is winged, obtuse, glabrous, turning brownish-black in drying. Nerves indistinct; rarely more than one sorus on each pinnule. Stalk of the involucre often longer than the involucre itself. It is upon the presence of this remarkable stalk, the more thick and coriaceous texture of the involucre, its opening into two valves or lips, and the large receptacles, that the generic character of this depends, as distinguishing it from *Diacalpe*, Bl.

3. DIACALPE, *Bl.*

Physematium, *Kze.* Cistopteris, *Pr.*

Sori globose, arising from the back of a vein or veinlet. *Receptacle* small, scarcely elevated. *Involucre* inferior, globose, hard-membranaceous, sessile, at first entire and covering the whole sorus, at length bursting very irregularly at the top. *Capsules* numerous, nearly sessile, with a broad *annulus*.—*Inhabiting* Eastern India. Fronds *fasciculated, large,*

herbaceous, decompound. Stipes *and* rachis *paleaceo-hirsute.* Veins *pinnated.* Veinlets *simple, free, clavate at the apex within the margin: lower anterior veinlet soriferous.* HOOK. GEN. FIL. TAB. 99.

1. D. *aspidioides. Bl. En. Fil. Jav. p.* 241. Aspidium foliolosum, *Wall. Cat. n.* 359. Cistopteris gigantea, *Pr.* Physematium aspidioides, *Kunze, Anal. Pterid. p.* 43.

Hab. Woods on the elevated mountains of Java, *Blume.* Sylhet, *Wallich.* Assam, *Mrs. Mack, Mr. Griffith.*—A graceful Fern, 2—4 feet high, with rather a long stipes, clothed below with very large, broad, opaque, brown, membranaceous scales. Similar scales, but smaller and almost rotundate, are seen at the axils of the pinnæ of the younger plants. Fronds tripinnate, primary pinnæ often nearly opposite: main and partial rachis frequently beset with copious short setose scales, especially beneath, sometimes with long crinite scales which also appear on the veins above: these afterwards disappear, and the rachis is then quite smooth. Pinnules submembranaceous, oblong-cuneate, pinnatifido-lobate, more or less decurrent, so that the rachis of the ultimate pinna is generally winged: — the lobes are deeper at the anterior edge. Veins dark-colored, simply pinnate, the veinlets undivided, not reaching quite to the margin. Involucres exactly globose, attached by a small point, dark mahogany-colored. Presl has strangely placed this in the genus *Cistopteris*, and yet appears to have seen a Wallichian specimen in the Royal Berlin Herbarium. Kunze refers it to the genus *Physematium*, but the firm texture of the involucre and the whole habit of the plant seem to forbid such an union.

4. ? ARACHNIODES, *Bl.*

"*Sori* roundish, scattered, inserted upon a slightly elevated *receptacle. Involucre* arachnoid, covering the sorus." *Bl.*

1. A. *aspidioides, Bl. En. Fil. Jav. p.* 242.

Hab. Summit of the mountain Burangrang, Java, *Blume.* — Of this we have but a short and imperfect description given by its discoverer, Blume; and its place among Ferns is doubtful to me. It is compared in its fructification to *Trichopteris*, Presl, or *Chnoophora*, Kaulf.; but the habit seems very different. A solitary specimen only appears to have been found, in all respects resembling *Aspidium coriaceum*, Sw., except that the pinnules are acute. "Nevertheless," Dr. Blume observes, "it cannot be associated with the *Aspidia*, the structure of the involucre being so different. It consists of a cobweb-like substance covering each sorus, soon evanescent, and so tender that it can scarcely be said to form a membrane."

5. WOODSIA, *Br.*

Physematium, *Kaulf.* Hymenocystis, *C. A. Mey.* Polypodii sp. *Auct.* Alsophilæ sp. *Spr.*

Sori globose, situated on the back of a vein or veinlet. *Involucre* inferior, soft-membranaceous, either from the first calyciform or pateriform, or more or less globose and sometimes in an early stage completely covering the entire sorus,

at length opening at the top, the margin or mouth irregular, lobed or fimbriated. *Capsules* globose, on short stalks, arising from a small punctiform receptacle.—*Small* Ferns, *mostly of temperate or even cold climates, cæspitose, stipitate, the* stipes *sometimes jointed and separating at the joint.* Fronds *membranaceous, tender, pinnatedly divided.* Veins *pinnated, simple or forked.* Hook. Gen. Fil. tab. 119 and 3.

Obs. The genus was established by Mr. Brown in 1813 upon the *Polypodium hyperboreum* and *Ilvense* of Linnæus, in which it must be confessed that the minute inferior cup-shaped or rather pateriform involucre is with difficulty seen, though its marginal fringe of hairs be sufficiently evident. To this genus Dr. Greville and myself had no hesitation in referring the *Alsophila Perriniana*, Spr. which has comparatively large involucres, almost covering the sorus, and simply lobed at the margin, the lobes spreading. From this structure the passage is but slight to the more globose involucre, lobed at the contracted mouth, of *Hymenocystis*, C. A. Mey., and this again cannot naturally be separated from *Physematium*, Kaulf., in which the involucre is at first perfectly globose and entire (see Kunze's excellent figure in *Analecta Pteridographia*, *t.* 27), afterwards it opens at the summit with an irregular mouth. These supposed genera of authors will therefore, with me, as with Mr. J. Smith, form but one: — but they may be conveniently divided into subgenera, as follows: —

Subgen. I. Physematium, *Kaulf. Involucre at first globose and probably entire, afterwards bursting at the top with an irregular contracted opening and persistent.* Hymenocystis, *C. A. Mey.* Hook. Gen. Fil. tab. 3.

1. W. *mollis*, J. Sm.; fronds lanceolate pinnate, densely clothed especially beneath with soft articulated hairs, pinnæ sessile oblong-ovate obtuse pinnatifid, segments approximate oval subrotund obtuse entire, sori marginal, involucres hairy at first apparently closed (*Kunze*), afterwards opening with a contracted jagged roundish mouth, rachis and stipes chaffy. Physematium molle, *Kunze in Bot. Zeit.* i. *p.* 341; *et Anal. Pterid. p.* 41, *t.* 27. Woodsia Mexicana, *Br. in Wall. Pl. Asiat. Rar. p.* 42, (*note*).

Hab. Mexico, *Scheide & Deppe.*— I have only seen garden specimens of this plant, and it thrives admirably, and fructifies in cultivation. The involucres, however, appear to me even in their youngest state to be a little open at the top, although this opening is difficult to be seen on account of the copious but yet pellucid articulated (and apparently glandular) hairs, which cover the surface of the involucre as well as of the frond: — and Mr. Brown seems to be of the same opinion, judging from his remark in Wallich, l. c. This involucre is very delicate, and more herbaceous, I think, than in any other of the genus. Kunze's figure is very characteristic. Plant from 6 or 8 inches to a foot high.

2. W. *Guatemalensis*, Hook.; fronds lanceolate pinnate glabrous, pinnæ sessile ovato-oblong attenuate obtuse deeply pinnatifid, segments rather remote ovate obtuse obscurely

crenato-serrate, sori intermediate between the margin and costa, involucres glabrous at first closed afterwards bursting at the top with an irregular roundish contracted opening, stipes and rachis with few small deciduous hair-like scales. (TAB. XXI. A.)

Hab. Guatemala, *Mr. Skinner*.—Nearly twice the size of the preceding, with all the herbaceous portion glabrous; the segments of the pinnæ more remote, more serrated or crenate. Sori pale brown, membranaceous, remaining long closed or entire at the top, then bursting and persisting with a contracted loose mouth.

3. W. *Peruviana*, Hook.; fronds oblong-lanceolate bipinnate piloso-glandulose, primary pinnæ nearly opposite remote sessile, ovate-acuminate, pinnules opposite or rarely alternate oblong obtuse sessile and decurrent so that the rachis is winged somewhat pinnatifid with shallow bicuspidate lobes, sorus solitary in each lobe subglobose at first entire afterwards bursting at the top with an irregular contracted mouth, stipes and main rachis glabrous. (TAB. XXI. B.)

Hab. Shady places, Huamantanga, Andes of Peru, *Mathews, n.* 602.—A very distinct species, and the tallest of any I am acquainted with, the frond with a portion of the stipes being 14 inches long. This frond is twice pinnated, the pinnules almost all opposite, very patent, rather remote, cut in a pinnatifid manner into a number of small lobes, which are bicuspidate, terminating in two, rarely three, sharp teeth.

4. W. (Physematium, *Kze.*) *Cumingiana*, Kze.; "frond narrow-lanceolate deeply pinnato-pinnatifid, pinnæ somewhat remote sessile lanceolate subacuminate rather obtuse glabrous above, beneath on the costa veins paleaceo-hirsute, segments oblong rounded glanduloso-dentate decurrent, sori solitary upon the teeth, involucres glabrous, rachis and stipes (of moderate length) subglabrous purple." *Kunze, Anal. Pterid. p.* 43.

Hab. "Probably in Chili," *Cuming*, (in *Herb. Kunze*). — "Between *W. Physematium*) *incisa* and *Perriniana*, but different from both. Stipes 3 inches, frond 7½ inches long, 2 broad. Lower pinnæ and superior ones smaller. *W. incisa* differs in the narrower pinnæ piloso-glandulose, obtuse, obtusely toothed, in the involucres being at length laciniated, the laciniæ reflexed. *P. Perriniana* differs especially in the pinnæ being deltoideo-ovate, minutely glanduloso-pilose, in the involucres being deeply cut, and the stipes and rachis chaffy." — I place this in the present group rather than the following, though the species is quite unknown to me, because in contrasting the involucres with those of the *W. incisa* and *Perriniana* (belonging to the next group) the author speaks of the deeply cut involucres of the latter, and their spreading segments, as if a contrary character existed in *W. Cumingiana*. It is probably allied to our *W. Peruviana*, and very likely not from Chili: at least I possess no such plant from Cuming gathered either in Chili or in Peru, and I had the choice of his collections immediately on his return from those countries.

5. W. *Caucasica*, J. Sm.; fronds lanceolate glabrous acuminate pinnate the costa and rachis slightly hairy, pinnæ sessile nearly opposite lanceolate but broadest at the base acuminate pinnatifid, segments ovate-oblong oblique obtuse dentate, sori 2 on each segment near the base one on each side the costa near the margin, involucres glabrous large membranaceous loose at first apparently entire with a central depression at length opening with a contracted depressed irregular and somewhat 2-lobed mouth. — Hymenocystis Caucasica, *C. A. Mey. Pl. Cauc. et Casp. p.* 229; *Hook. Gen. Fil. t.* 3. Physematium fragile, *Kunze, Anal. Pteridog. p.* 42. Dicksonia fragilis, "*L. C. Trevir. in Berl. Mag.* vii. 1816, *p.* 155, *tab.* 3, *f.* 18, 19." Aspidium Caucasicum, *Fisch. in Herb. nostr.*

Hab. The country adjacent to the Caspian Sea, *F. Blume*. Rocky places in the Caucasus, at an elevation of 1000—6000 feet above the level of the sea, *C. A. Meyer*. — A span or more high, with the frond and the pinnæ more acuminated than in any other *Woodsia*, and somewhat resembling *Cistopteris fragilis*. The involucres are peculiarly large for so small a plant, the two on each segment often meeting together over the costa and the other side overlapping the margin: they seem too large for the sorus, which gives them a somewhat irregular and bullate form, considerably different from other fructifications in the genus.

6. W. *elongata*, Hook.; glanduloso-pilose especially above, fronds oblong elongated pinnated, pinnæ rather distant alternate sessile from a broadish base oblong-obtuse pinnatifid not more than half way down, segments short rounded inciso-dentate each bearing a sorus (rarely more) on the lower anterior veinlet near the sinus, involucres small soon bursting with an irregular opening at the top glanduloso-pilose, stipes and rachis slightly chaffy. (Tab. XXI. C.)

Hab. Northern India. Himala mountains, *Lady Dalhousie*. Krande, *Pakenham Edgeworth, Esq.* — A very distinct and well-marked species with a short stipes; the frond from a span to a foot in length, bearing numerous pinnæ which are scarcely broader at the middle of the rachis than at the base, and the apex of the frond is but little attenuated. Pinnæ and segments very obtuse, but the latter strongly even incisedly toothed. In other respects it perhaps resembles the *W. mollis* more than any other species.

Subgen. II. (Perrinia, *Hook.*) *Involucre subhemispherical, from an early stage open at the top and soon breaking down into spreading, irregular, jagged, deciduous lobes or segments, always larger than the sorus.*

7. W. *obtusa*, Hook.; frond broad-lanceolate glabrous or minutely glanduloso-pilose pinnate, pinnæ remote subopposite slightly petiolate deltoideo-ovate obtusely attenuated deeply pinnatifid the lower ones again pinnate, segments or pinnules oval dentate or inciso-pinnatifid, sori solitary in each

tooth or lobule and near the sinus, involucres glabrous very thin and fragile soon breaking down into spreading lobes, stipes and rachis partially chaffy. Physematium obtusum, *Hook. Fl. Bor. Am. v.* ii. *p.* 259. Aspidium obtusum, *Willd. Schkuhr, Fil. t.* 43 (*figure bad*). *Pursh, Am. v.* ii. *p.* 262. Polypodium obtusum, *Sw. Schkuhr, Fil. t.* 21. Woodsia Perriniana, *Hook. et Grev. Ic. Fil. v.* i. *t.* 68. Physematium Perrinianum, *Kze. Anal. Pterid. p.* 43. Alsophila Perriniana, *Spreng.*

Hab. United States of America; Pennsylvania to Virginia, *Pursh.* Kentucky, *Dr. Short, Mr. Peter.* West side of the Rocky Mountains, near the sources of the Columbia, *Douglas, Drummond.*—It is probable, as suggested in the 'Flora Boreali-Americana,' that this Fern is not a native, though it has been so stated, of the West-Indies. It seems to be wholly confined to North America, and I possess unusually fine specimens, 12—14 inches long, from Dr. Short of Kentucky. It is a most distinct and well-defined species: and is assuredly the old *Aspidium obtusum* of American authors.

8. W. *incisa*, Gill. Hook. & Grev.; fronds broad-lanceolate minutely glanduloso-pilose pinnated, pinnæ approximate subopposite sessile oblong obtusely attenuated deeply pinnatifid sometimes again pinnate, segments or pinnules oval pinnatifidly lobed and toothed or incised the teeth obtuse, sorus solitary on each lobule near the sinus, involucres glabrous very thin and fragile soon breaking down into spreading lobes. *Hook. et Grev. Ic. Fil. t.* 191. Physematium incisum, *Kunze, Anal. Pterid. p.* 43.

Hab. Shady mountain rocks, near Mendoza, and San Luis de Cordova, Argentine Republic, *Dr. Gillies.*—Quite distinct from the preceding and from every other species, and apparently only discovered in the locality above mentioned.

Subgen. III. WOODSIA vera. *Involucres minute, pateriform, covered and concealed by the capsules, the long hairs of the margin only projecting beyond the sorus. Stipes with a joint.* HOOK. GEN. FIL. TAB. 119.

9. W. *Ilvensis*, Br.; slightly hairy above, stipes rachis costa and nerves below crinite and clothed with copious rufous chaffy scales, frond broad-lanceolate, pinnæ oblong obtuse broader at the base sessile deeply pinnatifid with many oblong obscurely crenated somewhat coriaceous segments.—*Br. in Linn. Trans. v.* xi. *p.* 173. *Hook. in E. Bot. Suppl. t.* 2616. Polypodium, *Sw.* Acrostichum, *Linn.* Nephrodium rufidulum, *Ph.*

Hab. Rocks; northern part of the northern hemisphere as far as Greenland; and mountainous regions in the temperate countries. Altai mountains, *Bunge.* Rare in Britain; Wales and Yorkshire.

10. W. *hyperborea*, Br.; glabrous or with the stipes rachis

and costa beneath slightly hairy mixed with a very few narrow pale chaffy scales, fronds linear-lanceolate pinnated, pinnæ cordato-ovate membranaceous pinnatifid with few (5—7) broadly obovate entire segments, the lower ones remote.—*Br. in Linn. Trans. v.* xi. *p.* 173. *t.* 11. Polypodium, *Sw. Presl. E. Bot. t.* 2023. P. Arvonicum, *Sm.*

Hab. Rocks; Arctic and subarctic countries of the northern hemisphere; very rare in the mountainous parts of the temperate regions; Savoy (*Hooker*): rare also in Britain. On Snowdon, Wales; Ben Lawers and in Clova, Scotland.—Some of the small hairy specimens, with a few chaffy scales, assuredly come very near the preceding; and I have seen individuals that I have found it difficult to pronounce upon: yet I believe they are really distinct. The present is generally the tallest and most tender and membranaceous plant, the fronds much narrower, the lower pinnæ distant and gradually becoming smaller from near the middle; the sori are larger, soon confluent.

11. W. *glabella*, Br.; quite glabrous, fronds linear tapering a little below pinnated, with the pinnæ very remote towards the short stipes, all of them deltoid thin and membranaceous very obtuse, cut into a few (3—7) short rounded or subcuneate nearly entire lobes.—*Br. in Richards. App. to Frankl. Journ. p.* 39. *Hook. Fl. Bor. Am. v.* ii. *p.* 259, *t.* 237.

Hab. Subarctic America; abundant about Great Bear Lake, *Dr. Richardson.*—This approaches much nearer to the last species than the first: but is more delicate and slender, of a paler colour, quite glabrous, far narrower in the frond and the lower pinnæ coming down much lower on the stipes.

SUBTRIBE III. *Sori on the apex of a vein or veinlet, and frequently projecting more or less beyond the margin.* EUDICKSONIEÆ.

6. THYRSOPTERIS, *Kze.*

Panicularia, *Colla.*

Sori subglobose, from the apex of thickened veins of portions of the frond which are destitute of parenchyme, subsecund, oblique. *Involucre* inferior, cup-shaped or between globose and hemispherical, coriaceous, the mouth open or but slightly contracted, entire. *Receptacle* large, globose, spongy, elevated. *Capsules* sessile, imbricated, compressed, with a large, oblique, nearly complete ring. *Seeds* 3-lobed. —*Arborescent* (?) Fern *of Juan Fernandez, with decompound glabrous shining coriaceous* fronds; sterile *and* fertile pinnæ *on the same frond, bitripinnatifid;* sterile ones *with the ultimate segments cuneato-lanceolate, obtusely serrated:* the veins *simple or forked, sunk, disappearing below the points:* fertile ones *similarly divided; but the foliaceous substance or parenchyme is not present, or closely surrounds the thickened rachis and veins, which thus form a much compound*

or thyrsoidal raceme or panicle, and the sori are stalked. Main rachis *stout, woolly (the wool deciduous), with a deep furrow on one side; it and the stipes unarmed.* Hook. Gen. Fil. tab. 44, A.

1. T. *elegans*, Kze. *in Linnæa*, ix. 506; *and in Schk. Fil. Suppl. p.* 3, *tab.* 1. "Panicularia Berteri, *A. Colla, Memor. Act. Torin. v.* xxxix. *p.* 33, *t.* 64."

Hab. In moist woody, shady, and mountainous places, Juan Fernandez, *Bertero*, 1830, (*n.* 1537).—Of this beautiful Fern, fine specimens were sent me by its lamented discoverer, marked "Cyathea? an potius Aneimiæ sp.?" and indeed the nature of the fronds and the thyrsoid character of the fructifications would induce one at first sight to suppose it would naturally rank near the latter genus: but the fructification is totally at variance with that, and may be considered identical with *Cyathea*, so far as the structure of the involucres and capsules and receptacles is concerned; nor am I yet sure that its proper place is not among Cyatheous plants. The terminal sori, however, upon the veins, and the general appearance of the fronds, lead to the conclusion that its natural position is near the true *Dicksoniæ*. Kunze remarks that "this Fern is said to have a caudex as thick as a walking-stick; whence it has been supposed to be arborescent." Bertero is silent in regard to the trunk, in his notes accompanying my specimens, and Presl does not allude to it. But the latter author says "An huic generi adnumeranda est *Chonta* Molinæ, quæ arbor, trunco atronitente a Chilensis ad baculos prædilectos usitato, foliis multidivisis, divisionibus tenuibus, baccis racemosis quæ hucusque ad Palmas relata fuit."

7. Dicksonia, *L'Hérit.*

Balantium, *Kaulf.* Culcita, *Pr.* Leptopleuria, *Pr.* Cystodium, *J. Sm.* Patania, *Pr.* Sitolobium, *Desv.*

Sori situated at the margin of the frond, and always from the apex of a vein. *Involucres* subglobose or reniform, coriaceous or membranaceous, formed, in part, of a more or less changed *lobule* of the frond and of the *proper involucre* more or less united, generally recurved, 2-valved or entire, frequently (in the subgenus *Patania*) cup-shaped or campanulate. *Receptacle* more or less elevated. *Capsules* sessile or stipitate, with an incomplete ring.—*Tropical* Ferns, *or inhabiting temperate climates, chiefly in the southern hemisphere, one in N. America; sometimes arborescent.* Fronds *generally ample, various in composition, frequently much divided into small, coriaceous or membranaceous pinnules.* Veins *pinnated, simple or forked.*—Hook. Gen. Fil. tab. 20. (Balantium, *Kaulf.*; but the original *Dicksonia*, L'Hérit.). Tab. 60, A. (Culcita, *Pr.*). Tab. 60, B. (Leptopleuria, *Pr.*). Tab. 96. (Cystodium, *J. Sm.*). Tab. 61, A. (Dicksonia, *Pr.*). Tab. 61, B. (Patania, *Pr.*)

Obs. It is not without the most careful consideration that I am induced

to unite the several genera above mentioned; and thus, as it were, to restore the original genus *Dicksonia*, as understood by L'Héritier. It is true, if we look at the majority of species of the *Patania*-group, there is a considerable difference, both in habit and apparently in the structure of the involucre, from the arborescent species of the *Balantium*-group; but, in regard to habit, all intermediate grades may be seen, and the difference of structure in the involucre is more in appearance than in reality. In both cases the involucre may be said to be double: there is a true and an accessory one; the true one, generally membranous, is situated near the margin, below a small lobule of the frond, which latter is recurved, more or less changed in texture, and united with the true one in a *greater* or *less* degree; in the first case forming the cup-shaped or campanulate, generally entire, involucre of *Patania*; in the latter case the 2-lipped or 2-valved involucre of *Balantium* &c. In some instances, as in our *D. Plumieri*, our *D. dubia* (*Davallia dubia*, Br.), the accessory and the true involucre are scarcely united, and then it is difficult to distinguish the genus from some *Davallieæ*, especially that group called *Microlepia* by Presl. In short, it may be said that the proper involucre of *Davallia* united with the accessory one of *Cheilanthes*, go to form that of *Dicksonia*.

Subgen. I. BALANTIUM. *Involucre distinctly 2-valved.* Balantium, *Kaulf.* Culcita, *Pr.* Leptopleuria, *Pr.* Cystodium, *J. Sm.*

1. D. *arborescens*, L'Hérit.; arborescent, fronds bi-tripinnate coriaceous, pinnæ oblong scarcely attenuated obtuse, pinnules or segments ovate acute serrated decurrent upper ones coadunate, fertile pinnules contracted, stipes rachis and costa beneath clothed with ferruginous glandular wool. (TAB. XXII. A.). *L'Hérit. Sert. Angl. p.* 31. *Wall. Cat. n.* 64. Dicksonia integra, *Sw.* Balantium arborescens, *Hook. Gen. Fil. l. c.* B. auricomum, *Kaulf. Enum. Fil. p.* 228, *t.* 21, *f.* 12. *Presl.*

Hab. Island of St. Helena, *Sir Jos. Banks, Dr. Solander, and various travellers;* only near the highest summit of Diana's Peak, *J. D. Hooker.* — Caudex 9 or 10 feet high, clothed with the bases of the old stalks of the fronds and crowned at the summit with a horizontal tuft of dark rusty green foliage. The fronds are peculiarly thick and coriaceous, tripinnate. Secondary pinnæ numerous, closely arranged, oblong-lanceolate, pinnate in the lower half, the rest coadunate. Pinnules and segments larger than in any of the genus. Sori generally on much-contracted pinnules, very large and conspicuous, copious. Clavate, glandular, articulated hairs are mixed with the capsules. The woolly ferruginous hairs of the rachis are also jointed. The sketch of the entire Fern here given (TAB. XXII), was made by Dr. J. D. Hooker, on returning from the Antarctic voyage in H. M. S. Erebus. He gathered also fine specimens of the fronds, and brought home living plants to the Royal Botanic Gardens of Kew.

2. D. *antarctica*, Labill.; arborescent, fronds supradecompound elliptical coriaceous glabrous, ultimate pinnæ oblong or oblong-lanceolate all of them acuminated at the apex, pinnules and segments ovate very acute pungent inciso-serrate, fertile ones pinnatifid scarcely altered, sori small, general rachis scabrous. — *Labill. Nov. Holl. v.* ii. *p.* 100, *t.* 249. *Br.*

Prodr. Nov. Holl. p. 157. Balantium antarcticum, *Presl.* Cibotium Billardieri, *Kaulf.*

Hab. Van Diemen's Land, *Labillardière, Brown.* Ravines in the mountainous parts of the island, and close to the sea on the southern shores, *Gunn, Backhouse, J. D. Hooker.* Summit of the Blue Mountains, New Holland, *Allan Cunningham*, 1823. — This is truly a noble arborescent Fern, with a trunk or caudex 30—35 feet high. It is well represented in the plate of a "Fern valley, Van Diemen's Land," in Mr. Backhouse's 'Narrative of a Visit to the Australian Colonies.' With a trunk, however, more lofty than that of *D. arborescens*, and fronds probably equally large, the pinnules and segments are very much smaller, not one fourth part of the size, and the apices of the pinnæ and pinnules are more acuminated. The sori are small, but equally copious on the segments, which are but little contracted in consequence of their presence. Fine living plants of this Fern exist in the greenhouse of the Royal Gardens of Kew, and in that of His Grace the Duke of Devonshire, at Chatsworth.

3. D. *Sellowiana*, Hook.; arborescent, fronds supradecompound coriaceous glabrous, general and partial pinnæ scarcely acuminated at the apex, the latter oblong-lanceolate, pinnules and segments ovate acute pungent inciso-serrate, fertile ones pinnatifid scarcely altered, sori small, general rachis quite smooth. (Tab. XXII. B.). Balantium Sellowianum, *Pr.*, (*according to specimens from the Royal Berlin Herbarium*). Dicksonia Organica, *Miers, MS. in J. Sm. Gen. Fil.* (*name only*).

Hab. Brazil, *Sellow.* Organ Mountains, *J. Miers, Esq. in Herb. nostr.*— In general appearance, in the size of the pinnæ, pinnules and ultimate segments, and in the size and form of the involucres, this has an exact affinity, except in the pinnæ not being so much acuminated, with the preceding, *D. antarctica:* nor can I detect any difference, save the less acuminated pinnæ, and the perfectly smooth, not rough, main rachis.

4. D. *Berteroana*, Hook.; arborescent, fronds decompound (tripinnate at least) coriaceous glabrous, pinnæ all acuminated, ultimate pinnæ or pinnules crowded oblong acuminate broader and imbricated at the base pinnatifid almost to the rachis, segments oblong-ovate acute somewhat pungent subfalcate serrated the lower ones free (ultimate pinnules) fertile ones narrower more elongated almost all free deeply pinnatifid into 7 or 8 lobes each of which bears a rather large sorus, stipes slightly rough more or less woolly. (Tab. XXIII. A.) Balantium Berteroanum, *Kunze, Anal. Pterid. p.* 40. Davallia? an sp. n.? an gen. distinct.? *Bertero MS. in Herb. nostr.*

Hab. Thickly wooded places on the elevated mountains of Juan Fernandez, *Bertero, n.* 1538.—Caudex 6—15 feet high, *Bertero.*—Here again we have a *Dicksonia* nearly allied to *D. antarctica* and *D. Sellowiana*, yet from a widely different locality to either of them. It is however more distinct from them, than they are from each other. The ultimate pinnæ and pinnules and segments are much more crowded, their bases literally imbricating each

other, the fertile fronds are more divided, the ultimate pinnæ (or pinnules) being again pinnated, the fructified segments more contracted, more deeply divided, and the sori are much larger, next in size indeed to those of *D. arborescens*. Our figure will give a better idea of these differences than can be conveyed by words.

5. D. *squarrosa*, Sw.; arborescent, caudex clothed with the bases of the old stalks, stipes (black) and rachis everywhere rough with raised points and frequently hispid with black spreading hairs, fronds coriaceous 3—4-pinnate, ultimate pinnæ oblong moderately acuminated deeply pinnatifid, segments ovate or oblong pungent and mucronately serrated, fertile segments much smaller contracted deeply pinnatifid each lobe bearing a rather small sorus, valves of the involucre both concave nearly equal. *Schkuhr, Fil. p.* 124, *f.* 130, (*barren frond only*). Trichomanes squarrosum, *Forst. Prodr. p.* 86.

Hab. New-Zealand. Dusky Bay in the middle island, southern extremity, *Forster;* extending northward probably through the whole of the middle and northern islands, *Allan and Richard Cunningham, Colenso, Sinclair, J. D. Hooker, and various travellers.* — Trunk 6—8 feet high, or perhaps more, crowned with noble tufts of bright green, beautifully graceful fronds, divided more copiously and into much finer segments in the fructified portions. The acutely and pungently serrated segments, the black stipes and rachis, rough with little elevated points mixed with black spreading bristles, readily distinguish this species from the two following.

6. D. *fibrosa*, Colenso; "arborescent, caudex bulky clothed with an excessively thick dry fibrous substance," main and partial rachis smooth (not rough) clothed with dense patent velvety hairs especially beneath, fronds coriaceous bipinnate (fertile tripinnate) primary pinnæ much acuminated, secondary or ultimate ones oblong-lanceolate acute deeply pinnatifid, segments ovate subfalcate pungently acute and sharply serrated lower ones free, fertile lobes smaller otherwise not much changed, the teeth or lobes soriferous, sori small, valves of the involucre both concave nearly equal." (Tab. XXIII. B.) D. fibrosa, *Colenso in Tasman. Journ. of Nat. Sc.*

Hab. In rich alluvial soil near rivers, in woods in Te Waiite district, northern island of New Zealand, January, 1842, *W. Colenso, Esq., n.* 289. — Of this species I only possess portions of a large frond, with copious fructifications. But, happily, Mr. Colenso's description is before me, from which I have been able to improve the specific character: and the following are his further general remarks. "This fine arborescent Fern attains in its native forests a height of 18 feet. In affinity it approaches very near to *D. squarrosa*, Sw., from which, however, it may, even at a distance, be readily distinguished by its trunk not being studded with broken-off and decayed petioles as in that species; but, on the contrary, thickly covered with fibres, which resemble those of the fibrous interior of the husk of the cocoa-nut. This fibrous epidermis increases in thickness with the age of

the plant; and in time causes it to appear unusually bulky. Some trees were noticed from 16—19 inches in diameter. The natives cut away this fibrous outside in thick slices, which they use for many purposes in the construction of their dwelling houses, and especially their stores for food. Being easier cut by them than wood, a piece resembling a small plank may readily be obtained. It is also found much more effectual than such timber as they, with their limited means, could cut, for excluding rats and mice, for these animals cannot gnaw the dry fibrous substance so readily as through wood. Its living fronds are few in number, spreading and deciduous; when dead they remain hanging for a long while thickly around the trunk, giving the plant a peculiar bushy appearance. Its foliage, when living, is much softer than that of *D. squarrosa*, which is very harsh and spiny, and much more deeply veined. The natives call this species *Wekiponga;* a word worth noticing, as showing the acuteness of their observation of natural productions: it being evidently derived from *Weki*, the name given by them to *D. squarrosa*, and *Ponga*, their name for *Cyathea dealbata;* this plant being, according to their ideas, intermediate between those two species; or possessing characters common to both, which undoubtedly it has in general appearance; uniting the softness of the foliage of the one, with the rough caudex and deciduous fronds of the other."

7. D. *lanata*, Colenso; subarborescent, stipes (pale brown) and rachis smooth but clothed with dense shaggy deciduous wool, fronds ovate bi-tripinnate coriaceous, ultimate pinnæ oblong shortly attenuated obtuse deeply pinnatifid, segments ovato-oblong obtuse subfalcate obtusely serrated, the lower ones free (pinnules), fertile segments smaller contracted deeply pinnatifid each lobe bearing a rather small sorus, valves of the involucre both concave nearly equal. (Tab. XXIII. C.). —D. lanata, *Colenso in Tasm. Journ. of Nat. Sc.* D. lævis, *Heward, MS. in Herb. nostr.*

Hab. New Zealand, northern island, first detected by *Mr. Allan Cunningham; J. D. Hooker.* Acclivities, cleared woods on the high shores of the east side of Waikare lake, December, 1841, *W. Colenso, Esq.* — This, so far as I can learn, and as Dr. Hooker's observation goes, does not rise much above the ground, and forms but a short imperfect caudex. It is extremely different from the two preceding species, in the quite smooth stipes and rachis, of a pale brown colour, clothed with copious yellowish deciduous wool, and the very blunt segments and serratures of the segments. Mr. Colenso indeed in his MS. now before me, mentions a variety "*β. hispida*, which is much larger, and grows on the mountain range of Wananake, near the Wangarei lake, E. coast. It attains to 5—6 feet in height, including the stipes, and is nearly quadripinnate; its pinnules too are more distant, segments oblong-linear and pinnatifid, and the hair of the stipes and frond is much more rigid and of a dark brown colour. I am almost inclined to consider it a distinct species, but wait the examination of better specimens than those at present in my possession." — I have received from this persevering and enthusiastic botanist a specimen marked "33, *Dicksonia*, n. sp.?" which I take to be the plant just alluded to. If so, though a rather striking variety, I still think it but a variety. The stipes and rachis are pale brown, slightly rough to the touch, but not sensibly to the eye, quite free from woolly covering, which has no doubt fallen away; but the base of the stipes is clothed with long, silky, dark brown setæ; the

sterile fronds are dark green above, pale beneath; the segments of the pinnæ larger; the fructifications are similar, but the involucres are yellow, not reddish-brown as is usually the case.

8. D. *Culcita*, L'Hérit.; caudex creeping, stipes with dense long fulvous silky hair at the base, fronds triangular 4-pinnate subcoriaceous glabrous, pinnules ovato-cuneate inciso-serrate or lanceolate and pinnatifid, fertile ones somewhat contracted, sori rather large 1—3 on each lobe or pinnule, involucres reniform on the anterior margin, the valves both concave nearly equal.—Culcita macrocarpa, *Pr. Hook. Gen. Fil. t.* 60, A. Balantium Culcita, *Kaulf.*

Hab. Madeira and the Azores, *Masson and other travellers.* In the latter island on mountains of 2—3000 feet of elevation, *Guthnic, H. C. Watson.* A well known and beautiful Fern, as far as I know, confined to the islands just mentioned. I can see no reason for separating this from *Dicksonia* (Balantium, *Kaulf.*), as Presl has done under the generic name of *Culcita*, and whose characters rest on the semilunate involucre, with the two valves alike, the transverse, linear and crest-shaped receptacle and large sori: while Mr. J. Smith retains the genus *Culcita* on the ground of the "slightly oblong and coriaceous texture of the frond with the remarkable criniferous rhizoma."

9. D. *coniifolia*, Hook.; caudex creeping?, fronds ample lax quadripinnate membranaceous glabrous, ultimate pinnules small lanceolate acuminate distant inciso-pinnatifid, the segments short oblong obtusely bi-tridentate, ultimate rachis compressed winged, main rachis woolly especially on one side, fertile pinnules scarcely contracted, sori large reniform terminating a short tooth membranaceous brown, the valves nearly equal of the same texture. (Tab. XXIV. A.)

Hab. Caracas, *Linden, n.* 538.—The caudex and stipes are unknown to me: they probably resemble *D. Culcita*, with which the involucres exactly agree; but the species is very different. Primary pinnæ 1½ foot long, 8—12 inches broad, supradecompound, lax and membranaceous, the general appearance resembling that of the leaf of some umbelliferous plant. Sori very large, dark brown, on short teeth or segments.

10. D. *Martiana*, Kl.; caudex creeping?, fronds quadripinnate, pinnæ lanceolate subpetiolate acuminate membranaceous but firm pinnatifid, the segments lanceolato-cuneate lower ones again subpinnatifid, teeth or segments acute, veins obscure internal, sori rare solitary in the axil of a tooth or lobe transversely oblong or reniform, valves convex nearly equal, lower one a little smaller, principal rachis with copious lax arachnoid rusty hairs. (Tab. XXIV. B.) — *Klotzch, MS. in Herb. Reg. Berol. et in Herb. nostr.*

Hab. S. Brazil, *Sellow.* — A peculiar looking species, apparently having ample much divided fronds with something the habit of a *Polystichum*, Schott, of a firm texture, not glossy, with obsolete veins, everywhere glabrous. Rachis slender, zigzag.

11. D. *dubia*, Gaud.; caudex creeping?, fronds tripinnate subcoriaceous, pinnæ deeply pinnatifid in the larger ones down to the winged rachis lanceolate inciso-serrate, the lower ones remote and again pinnatifid hairy beneath (at length glabrous), sori globose, upper valve of the involucre formed of a scarcely changed tooth or lobule of the frond reflexed, lower one small convex membranaceous and jagged. (TAB. XXIV. C.)—*Gaudich. in Freyc. Voy. Bot. p.* 367. Davallia dubia, *Br. Prodr. p.* 157. Balantium Brownianum, *Pr. Pter. p.* 134, *t.* 5, *f.* 4. Dicksonia fallax, *Kaulf. in Sieb. Syn. Fil. n.* 111, *Fl. Mixt. n.* 247. Woodsia? dubia, *Desv.*

Hab. Port Jackson, and Tasmania, *Brown, Sieber, Sinclair, Bynoe, Gunn, J. D. Hooker.*—A pale straw-coloured species, with coriaceous rigid apparently ample fronds, generally with rusty hairs beneath. Mr. Brown places this plant in *Davallia*, because he does not consider the small reflexed lobule which partially covers the sori as a portion of the involucre, which may well be considered doubtful, as is that of *D. adiantoides:* but from analogy, and especially from the close affinity of the species with *D. straminea*, I prefer ranging it in *Dicksonia*, as Gaudichaud and Kaulfuss have done. Presl represents a more evident two-valved involucre than I find, and one exactly resembling that of *Dicksonia straminea*, Labill.

12. D. *straminea*, Lab.; caudex creeping?, "fronds triplicato-pinnate, pinnæ acuminate greenish-yellow beneath, pinnules trapeziform-oblong obtusely serrated, stipes and rachis naked semiterete furrowed." *Labill. Sert. Austr. Caled. p.* 7, *t.* 10.

Hab. New Caledonia, *Labillardière.* Offach, Ile Waigiou, *D'Urville.*—This has much the habit and general appearance of our *D. dubia* (*Davallia dubia*, Br.), so that, were it not for the glabrous fronds (of rare occurrence in *D. dubia*), and the larger inferior valve of the involucre, I should take the two species to be identical.

13. D. *davallioides*, Br.; caudex creeping?, "fronds supradecompound membranaceous flaccid somewhat hairy beneath, pinnules oblong incised with few sori, involucres glabrous, exterior valve smaller." *Br. Prodr. p.* 158. Sitolobium, *J. Sm.*

Hab. Port Jackson, *Brown.*—"Closely allied to *Davallia dubia.*"

14. D. *Kaulfussiana*, Gaud.; "fronds triplicato-pinnate, primary and secondary pinnæ elongato-acuminate at the apex serrulate, pinnules ovate-oblong rather acute crenulato-dentate cuneate at the base beneath and on the rachis villous, involucres pilose." *Gaud. in Freyc. Voy. p.* 368. "Davallia hirta," *Kaulf. En. Fil. p.* 223.

Hab. Mowi, in the Sandwich Islands, 12—14000 feet of elevation, *Gaudichaud.* Owhyhee, *Chamisso?*—Gaudichaud says his plant has a great resemblance to the large variety of *Dicksonia davallioides*, Br.; and quotes Kaulfuss' *Davallia hirta* of Oahu as the same, observing that although the upper valve of the involucre, formed by the inflexed lobule of the frond, is

not very distinct, yet that it is sufficiently so to determine that this plant cannot be confounded with *Davallia*; — whereas Kaulfuss remarks, on his species, that "it possesses the habit of *Dicksonia*, but the fructification of *Davallia*."

15. D. *abrupta*, Bory; caudex creeping scaly, fronds lanceolate pinnate, pinnæ sessile lanceolate doubly serrated broad and cordate or truncate at the base, upper ones fertile narrower acuminated, involucres along the whole margin upon short broad teeth coriaceous dark brown reniform, outer valve largest and convex, inner nearly plane operculiform.— *Bory, Voy. v.* ii. *p.* 187, *t.* 30. *Sw. Syn. Fil. p.* 138. *Hook. Gen. Fil. t.* 6, B. Leptopleuria, *Presl.*

Hab. Bourbon, amongst scoriæ and lava, *Bory, Carmichael.* — Pinnæ 3—4 inches long, an inch broad at the base of the lower ones. Veins copious, parallel.

16. D. *sorbifolia*, Sm.; fronds bipinnate, pinnæ subpetiolate acuminate serrated especially towards the apex truncate at the base, fertile ones narrower margined with fructifications, involucres subglobose membranaceous, outer valve cucullate, inner small and nearly plane, rachis and costa hirsute. (Tab. XXV. A.) — *Sm. in Rees' Cycl. v.* vii. D. Moluccana, *Wall. Cat. n.* 2174. Cystodium sorbifolium, *J. Sm.*—*Hook. Gen. Fil. t.* 96.

Hab. Isle of Honimoe, E. Indies, *Mr. C. Smith.* Moluccas, *Herb. Roxburgh.* — Evidently allied to *D. abrupta*, but more compound, with much smaller pinnæ, distant veins and different involucres.

17. D. *Plumieri*, Hook.; fronds tripinnate ample glabrous, pinnæ subpetiolate broadly lanceolate acuminate deeply pinnatifid cuneate at the base, the segments oblong acute or acuminate crenate the teeth everywhere bearing sori, involucres suborbicular deeply 2-valved membranaceous, outer valve convex at length cucullate and covering the nearly plane smaller inner one.—Davallia adiantoides, *Sw. Syn. Fil. p.* 131. *Willd. Sp. Pl. v.* v. *p.* 469. D. Domingensis, *Spr. Anl. v.* iii. *p.* 149, *f.* 33. Cibotium, *Pr.* Microlepia, *J. Sm.* — *Plum. Fil. t.* 7.

Hab. St. Domingo, *Plumier.* Jamaica, *Wiles, Wright, McFadyen, Bancroft.* Dominica, *Dr. Imray.*—Apparently a large-growing Fern, with ample fronds and copious fructifications. These latter are almost intermediate between *Davallia* and *Dicksonia*: the outer valve, at first only a tooth or small lobe of the frond, afterwards becomes convex, thinner, and finally of nearly the same texture as the inner one, which it frequently involves as with a hood. The difficulty of determining the genus of this plant may be inferred from the several genera in which it has already been placed.

18. D. *Lindeni*, Hook.; frond tripinnate ample glabrous, pinnæ narrow-lanceolate acuminate pinnatifid, segments lan-

ceolate acuminate deeply and sharply inciso-serrate lower ones often distinct the serratures bearing the fructifications, involucres suborbicular, outer valve at length convex inner smaller both membranaceous and united into a compressed almost complete cup. (Tab. XXV. B.)

Hab. Caraccas, Linden, *n.* 166.—This is, in many respects, allied to the preceding, but differs in the pinnæ and segments being narrower and more acuminated, and sharply inciso-serrate. Involucres approaching those of the *Patania*-section, but compressed, and standing forward, almost as in *Deparia*.

Doubtful Species of this Section.

19. D. *marginalis*, Sw.; "fronds pinnate, pinnæ ensiform auricled and incised above, upper ones coadunate, stipes villous." *Sw. Syn. Fil. p.* 138 *and* 362. *Willd. Sp. Pl. v.* v. *p.* 482. Polypodium marginale, *Thunb. Jap.* 337.—Hab. Japan, *Thunberg*.—This should perhaps be placed next *D. abrupta*.

20. D. *linearis*, Cav.; "fronds subbipinnate, pinnæ alternate linear, pinnules of the same form crenulate." *Sw. Syn. Fil. p.* 138. *Willd. Sp. Pl. v.* v. *p.* 483. *Cav. Præl.* 1801, *n.* 683.—Hab. Marianne and Philippine Islands.—This plant seems to be only known on the authority of Cavanilles.

21. D. *Japonica*, Sw.; "fronds subbipinnate, pinnules rhombeo-ovate obtuse serrated and as well as the stipes pubescent." *Sw. Syn. Fil. p.* 138 *and* 360. *Willd. Sp. Pl. v.* v. *p.* 483.—Hab. Japan.—Swartz and Willdenow quote under this species *Polypodium cristatum Japonicum*, Houtt. Linn. Pfl. Syst. p. 208, t. 99, f. 3; but Brown gives this as a synonym to his *Davallia flaccida*.

22. D. *strigosa*, Sw.; "fronds bipinnate, pinnæ ensiform, pinnules rhombeo-oblong rather acute incised, segments obovate dentate, stipes and rachis pubescent." *Sw. Syn. Fil. p.* 138. *Willd. Sp. Pl. v.* v. *p.* 484. Trichomanes, *Thunb. Jap.* 339.—Hab. Japan.—I am not aware that anything more is known of this Fern than what is here given.

(D. *polypodioides*, Sw.—This is probably the *Davallia flaccida*, Br.; since Forster's *Polypodium nudum*, Prodr. n. 446, is the authority for it, and the *Microlepia polypodioides*, Pr.)

23. D. *Zeylanica*, Sw.; "fronds supradecompound, pinnules oblong obtuse sinuato-pinnatifid, the segments obovate gibbous dentate, stipes glabrous." *Sw. Syn. Fil. p.* 138 *and* 358. *Willd. Sp. Pl. p.* 489.—Hab. Ceylon, *Thunberg*.—Swartz compares this with his *D. flaccida* and *D. dissecta*, and it may perhaps be of the *Patania*-section: but his remark on the involucres is at variance with that genus. "In-

dusia duplicia soruni amplectentia: *exterius* e denticulo obtuso concavo inflexo in sinu pinnulæ; *interius* oppositum, e membrana semicirculari integra, plicata, pallida."

24. D.? *Madagascariensis*, Kze.; "frond membranaceous tripinnato-pinnatifid hairy on each side at the veins, primary pinnæ ovato-oblong, secondary alternate subsessile unequally ovato-oblong falcate acuminate, pinnules unequally oblong deeply pinnatifid, segments shortly oblong obtuse inciso-crenate, sori of the crenatures intramarginal rounded, interior involucre semi-lunate, rachis hairy, secondary margined." *Kze. Anal. Pter. p.* 38.

Hab. Madagascar, whence very incomplete portions have been brought by *M. Goudot.* — Kunze is very doubtful about the genus of this plant. It would appear, from the description of the involucre, to belong to the *Balantium*-group, if a *Dicksonia* at all.

Subgen. II. PATANIA. *Involucres cup-shaped or subcampanulate.* Patania, *Pr.* Dicksonia,* *Pr.* Sitolobium, *Desv.*

(Ultimate divisions or pinnæ large, more than an inch long. Sp. 25—29*).*

25. D. *Pavoni*, Hook.; fronds ample bipinnate, pinnæ sessile broadly oblong acuminate pinnatifid about half-way down, upper ones obtuse coadunate, segments or lobes broad short rounded slightly margined nearly entire and pubescenti-ciliate, sori 1—6 in the sinuses chiefly on the upper margin rather small at length shallow cup-shaped membranaceous, rachis somewhat zigzag and as well as the costa downy. (TAB. XXVI. A.)—Davallia arborescens, *Willd. Sp. Pl.* v. *p.* 470. *Plum. Fil. p.* 7, *t.* 6.

Hab. Hispaniola, *Plumier.* Peru, *Ruiz and Pavon, in Herb. nostr.* — I think there can be little doubt of the figure of Plumier belonging to this species. If so, the stem is arborescent; "3 feet high and 6 inches in diameter;" and that is the authority for *Davallia arborescens*, Willd., which seems to be hitherto only known from Plumier's figure and description. It is probably extremely rare. Plumier found it in only one spot in St. Domingo, and the single specimen that has come under my observation is from the herbarium of Ruiz and Pavon. The pinnæ are 5—6 inches long, and at the base 1½ inch broad.

26. D. *concinna*, Hook.; "fronds bipinnate glabrous, pinnules alternate linear-lanceolate attenuato-acuminate deeply

* I am aware that Presl considers a 2-valved involucre as a character of his *Dicksonia;* but I do not find it in the species he brings under that genus, nor do his figures represent it so, any more than those of his *Patania.* Probably, owing to pressure of the specimens, or from the opening of the involucre being transverse, an appearance of two short lips may be given; but I do not think that it is so in reality.

pinnatifid, segments ovato-oblong obtuse superior base truncate inferior base abscisso-cuneate, the superior margin and apex incised, incisions obtuse emarginate fructiferous, rachis scabrous." Davallia concinna, *Presl, Reliq. Hœnk. p.* 66. Patania, *Pr. Tent. Pterid. p.* 138.

Hab. ——? (*Presl*).— From the above character I should have been disposed to refer this to our *D. Plumieri*, (n. 17): but the author says of it, "affinis *Davallia arborescenti*, Willd.," which is identical, in my opinion, with our *Dicksonia Pavoni;* and Sprengel, without any doubt, adduces it as a synonym to *Davallia arborescens.*

27. D. *adiantoides*, H. B. K.; fronds ample spreading glabrous 2—3-pinnate, primary divisions acuminate, pinnæ broadly lanceolate acuminate more or less deeply pinnatifid obliquely cuneate at the base and decurrent, the segments broadly ovate very obtuse nearly entire or lobato-dentate bearing sori (1—3) in the sinuses mostly at the upper margins rather small cup-shaped. (Tab. XXVI. B.)—*H. B. K. Nov. Gen. Am.* i. *p.* 24. *Willd. Sp. Pl.* v. *p.* 488. "D. bipinnata," *Cav. Præl.* 1801, *n.* 682. Dicksonia altissima, *Sm. in Rees' Cycl. v.* xi? Polypodium globuliferum, *Lam. Encycl.* v. *p.* 554. *Plum. Fil. t.* 30.

Hab. Hispaniola, *Plumier, Thierry.* Caraccas, *Humboldt, Linden, n.* 156.— This is a noble species, with large pinnæ, somewhat resembling our *D. Pavoni*, but differing in the form of the pinnæ, in the fructifications and in the absence of all hair. Sir J. E. Smith refers to Plumier's figure for his *D. altissima*, but describes his plant as having zigzag hairy ribs and veins, which better accords with *D. Pavoni.*

28. D. *erosa*, Kze.; "frond coriaceous subtripinnate, secondary pinnæ divergent lanceolate acuminate, pinnules unequally ovato-oblong cuneate at the base below and decurrent above subauriculate with the rounded or truncate apex emarginate or crenate, the margin obtusely falcato-dentate, rachis rough below squamoso-canaliculate, stipes chaffy." *Kze. in Pl. Crypt. Poepp. p.* 88 (*not* Patania erosa, *Presl, Pterid.* nor *Hook. Gen. Fil.*)

Hab. Woods at Pampayaco, Peru, frequent, *Poeppig.*— "Fronds very large, 6—9 feet. Our plant differs from *P. ordinata*, Kaulf., an allied species, in the coriaceous frond, in the secondary pinnæ being remote, broader pinnules more rounded at the apex, the rachis beneath asperulous, above squamulose. *Dicks. adiantoides*, H. B. K. and Willd., and Plum. t. 30, may be distinguished by the stipes and the rachis being subpuberulous or glabrous."— From these remarks of Kunze, it seems that this species has the closest affinity with *Dicks. adiantoides.* But the *Patania erosa* of Presl, and, following him, of our Gen. Fil. l. c., is, judging from Presl's figure of a pinnule, a very distinct species, which I here refer to *D. cicutaria.*

29. D. *ordinata*, Kaulf.; "fronds tripinnate, secondary pinnæ lanceolate attenuato-caudate patent, pinnules oblong-lan-

ceolate inciso-dentate truncate at the apex bearing about 6 glabrous sori, segments truncate emarginato-dentate, stipes and rachis glabrous." *Kaulf. En. Fil. p.* 226.

Hab. Porto-rico, *Ventenat.* — "Sufficiently different from the *D. adiantoides* in the form of the pinnæ and of the pinnules."

(Ultimate divisions or pinnæ small, less than an inch, generally much smaller. Sp. 30—51*).*

30. D. *cicutaria*, Sw.; fronds spreading tripinnate, ultimate pinnæ ovate or ovato-lanceolate cuneate at the base and decurrent upon a winged rachis rather distant obtuse lobed or pinnatifid half way down to the costa, the base above generally auricled, segments varying in length frequently falcate with the lower ones sometimes acute projecting beyond the sorus, sori solitary rather large cup-shaped, rachis costa and veins glabrous or hairy, the latter prominent or level with the surface.—*Sw. Syn. Fil. p.* 137. *Willd. Sp. Pl.* v. *p.* 487. D. pilosiuscula, *Raddi, Fil. Bras. p.* 63 (excl. syn.) D. Hookeriana, *Kl. in Herb. Reg. Berol. et in Herb. Hook.*—β. frond more membranaceous. *Sloane, Jam.* i. *t.* 57, *f.* 1, 2 (*excellent*). *Plumier, t.* 31.? D. tenera, *Mart. Pl. Crypt. Bras. p.* 96, *t.* 66 (*excellent*). *Hook. Gen. Fil. t.* 61, A. D. adiantoides, *Link* (*not H. B. K.*)—γ. barren segments more cuneate and serrated above. D. dissecta, *Sieb. Syn. Fil. n.* 198, (*not Sw.*) — δ. pinnules larger brighter green less deeply lobed. Patania erosa, *Pr. Pterid. p.* 138, *t.* 5, *f.* 12, 13, (*not* Dicks. erosa, *Kze.*) *Hook. Gen. Fil. t.* 61, B.

Hab. Jamaica, *Sloane, Swartz*, and probably general in the West-India Islands. Brazil, *Raddi, Sellow, Gardner, n.* 5327, and 201, *Macrae.* Cocos Island, N. Pacific, *Menzies, Barclay.* Guayaquil, *Hænke.* Vera Cruz and Jalapa, Mexico, *Linden.* — β. Brazil, *Martius.*—γ. Guatemala, *Skinner.* Quebrada of Panahuanca, Peru, *Mathews, n.* 974.—This is assuredly a very variable plant, and the ultimate segments and pinnules exhibit rather different forms in different plants and different parts of the same plant. Sloane's figure is my guide for the species, and is excellent for the common state of Jamaica. This is rather firm in texture, but submembranaceous and remarkable for the deep sinuses of the lower segments of many of the fertile pinnules, which are falcate, curving upwards, and bearing a solitary sorus in the axil. Martius' plate is equally characteristic, differing in nothing from true *cicutaria*, but in being a little more thin and tender. Of the *var.* γ. I possess only one specimen, and this with few fertile pinnules. It perhaps scarcely deserves to be deemed a variety. All these are of a dull opaque colour, generally verging to black when dry. Our *var.* δ. has larger more hairy pinnules, less deeply lobed; they are of a bright or lively green, and so exactly correspond with the *Patania erosa* of Presl, that I cannot but look upon that as the same, and very different from the *Dicks. erosa*, Kze., although Presl considers it to be identical. The ultimate pinnæ, or pinnules, are always on a rachis which is distinctly winged.

31. D. *cornuta*, Kaulf.; "fronds tripinnate, pinnules oblong

pinnatifid rotundato-sinuate truncate and crenate at the apex, costæ hairy beneath, segments oblong truncate falcate, partial rachis pubescent." *Kaulf. En. Fil. p.* 227.

Hab. Brazil, (*Sprengel*). "Sori rather large, oblong, transverse, in the sinuses of the segments. Indusia ovate, transversely dehiscing." Whether the appearance of transverse opening of the involucres be occasioned by pressure in drying, or not, I am doubtful. I suspect the species is nearly allied to *D. cicutaria*.

32. D. *dissecta*, Sw.; fronds spreading tripinnate, ultimate pinnæ or pinnules lanceolate cuneate at the base and decurrent upon a slightly winged rachis deeply pinnatifid with long narrow segments the lower ones of which are often inciso-pinnatifid, sori rather small solitary in the sinuses of the segments cup-shaped, rachis and costa slightly hairy.—*Sw. Syn. Fil. p.* 136. *Willd. Sp. Pl. p.* 486. *Schkuhr, Fil. t.* 130, *b. Martens et Galeotti, Fil. Mex. p.* 77. Dicks. expansa, *Kaulf. in Sieb. Syn. Fil. n.* 110.

Hab. Jamaica, *Swartz*, *Bancroft*, *Wiles*. Vera Cruz, Mexico, *Galeotti*. —What I take for this plant, and from whence I have drawn up my specific character, might, I think, without violence to nature, be considered a variety of *D. cicutaria*, with narrower pinnules and finer segments. Schkuhr's figure is sufficiently accurate.

33. D. *apiifolia*, Sw.; fronds tripinnate, pinnules rhombeo-lanceolate deeply inciso-pinnatifid subpetiolate and decurrent on a slightly winged rachis, the segments narrow-linear acute pointing upwards, sori rather small on short teeth in the sinuses of the segments, rachis and costa quite glabrous. (Tab. XXVI. C.)—*Sw. Syn. Fil. p.* 137. *Willd. Sp. Pl. p.* 487. D. apiifolia, *β.* dissecta, *Desv. et Kze. Pl. Crypt. Poepp. p.* 88. D. angustidens, *Pr.*

Hab. Jamaica, *Swartz*. Maynas, Peru, *Poeppig*.—My character of this is taken from Poeppig's specimen, the same as Kunze's plant, and which seems to me to be the same with *D. apiifolia*, Sw.; a name it appears well to deserve. Swartz, however, was unacquainted with the fructification, and of course the genus was doubtful to him. It is remarkable for the inciso-pinnatifid character of the pinnules, their narrow segments and their tapering almost into a footstalk, which however is decurrent and forms a very narrow wing upon the rachis.

34. D. *flaccida*, Sw.; "fronds triplicato-pinnate, primary and secondary pinnæ acuminate, pinnules ovato-oblong acute pinnatifid, segments oblong-cuneate the upper margin unequally and obtusely dentate, the upper fructiferous ones bidentate, stipes and rachis downy." *Willd.* — *Sw. Syn. Fil. p.* 137 *and* 357. *Willd. Sp. Pl.* v. *p.* 489. *Schkh. Fil. t.* 129. Dennstädtia flaccida, *Bernh. in Schrad. Journ.* 1801, *t.* 1, *f.* 3. Trichomanes flaccidum, *Forst. Prodr. n.* 472.

Hab. Pacific Isles, *Forster.* — I have seen no specimens of this from the "Pacific Isles," save Forster's original ones in the Banksian herbarium; and as far as can be judged from them, and indeed from the description and figures above quoted, it may safely be referred to *D. cicutaria*, which we know grows at Cocos Island. Swartz describes a double indusium, which, if correct, would induce us to refer the species to the *Balantium* division: but Bernhardi's figure represents it as an entire cup.

35. D. *Moluccana*, Bl.; "frond tripinnatifid coriaceous somewhat downy beneath, pinnæ opposite oblongo-lanceolate acuminate, pinnules lanceolate rather obtuse deeply pinnatifid, segments dimidiato-ovate obtusely toothed on the upper margin, rachis and scandent stipes aculeate." *Bl. Fil. Jav. p.* 239.

Hab. Mountains of the Moluccas, *Blume.*—"Distinguished from *D. flaccida*, Sw., by the aculeate rachis."

36. D. *scandens*, Bl.; frond tripinnatifid or supradecompound membranaceous glabrous, pinnæ opposite oblongo-lanceolate acuminate, pinnules lanceolate rather obtuse deeply pinnatifid, segments dimidiato-ovate obtuse bluntly inciso-dentate, rachis and scandent stipes aculeate." *Bl. Fil. Jav. p.* 240.

Hab. Lofty mountains of Java. On the volcanic mountain, Gede, Pallasarie, &c. *Blume.* — "Differs from the preceding (*D. Moluccana*) in the flaccid frond and in the larger teeth of the segments."

37. D. *Javanica*, Bl.; "frond decompound coriaceous, at the costa beneath and on the rachis hairy, pinnæ alternate and the pinnules (which are nearly opposite) ovato-oblong very acuminate, secondary subrhombeo-lanceolate acute deeply pinnatifid, the segments cuneato-linear rather obtuse unequally and obtusely dentate bearing sori in the sinuses." *Bl. Fil. Jav. p.* 240.

Hab. Mountain woods of Java, *Blume.* — "*Dicksonia flaccida*, Sw., differs in the segments of the frond being broader and more obtuse."

38. D. *distenta*, Kze.; "frond ample remotely tripinnato-pinnatifid slightly hairy at the veins on each side, primary pinnæ ovate and secondary sessile subopposite patent oblong acuminate, pinnules unequally ovato-oblong obtuse deeply pinnatifid, segments oblong subfalcate sinuato-dentate bearing sori in the sinuses, sori transverse, stipes and rachis a little hairy furrowed above." *Kze. Anal. Pterid. p.* 39. *Linnæa, v.* iii. *p.* 145.

Hab. Xalapa, Mexico, *Schiede.* — From the "transverse" sori and the "indusium proprium semilunatum, marginale, *brevissimum*," I should have been disposed to refer this to the *Balantium*-group; but the author compares it with *D. rubiginosa*, *D. anthriscifolia* and *D. cornuta*, among which, the plant being wholly unknown to me, I have thought it best to place it.

39. D. *rubiginosa*, Kaulf.; fronds spreading ample tripinnate, pinnæ oblong obtuse hairy especially beneath, the segments oblong dentato-pinnatifid especially on the superior margin membranaceous firm often brown and glossy above, sori very small chiefly on the superior margin in the sinuses of the sharp teeth cup-shaped compressed (from drying?), rachis and costa clothed with rufous down. (TAB. XXVII. A.) —*Kaulf. Enum. Fil. p.* 226.

Hab. Brazil, Rio Janeiro, (*Kaulfuss*); *Gardner, n.* 5672. Tejuca, *Martius.* Bahia, *Blanchet, n.* 2236. Vera Cruz, Mexico, *Linden, n.* 76, and Chiapas, Columbia, *Linden, n.* 1537. Peru, *Mathews, n.* 1096 and 1829. Guatemala, *Skinner*, Jamaica, *Purdie, Bancroft.*—Apparently an abundant species in the above-mentioned localities, and, in my opinion, a very distinct one. The pinnæ and segments are remarkably uniform in size and structure, and the sori amongst the smallest of the genus.

40. D. *anthriscifolia*, Kaulf.; fronds ample spreading tripinnate, pinnæ ovato-oblong pinnatifid nearly to the costa, segments oval-oblong obtuse dentate soriferous in the axils of the teeth, rachis glabrous, costa and veins slightly hairy. (TAB. XXVII. B.)—*Kaulf. En. Fil. p.* 227. *Kze. in Linnæa, v.* v. *p.* 45. *Sieber, Syn. Fil. n.* 60. *Fl. Mixt. n.* 314. Cheilanthes, *Bory in Willd. Sp. Pl.* v. *p.* 461.

Hab. Bourbon, *Bory.* Mauritius, *Bojer, Sieber, Telfair.* — A species with ample spreading fronds much resembling those of *D. rubiginosa*; but more delicate and very slightly hairy.

41. D. *punctiloba*, Hook.; fronds lanceolate bipinnate membranaceous, pinnæ lanceolate rather obtuse deeply pinnatifid, the segments oblong obtuse toothed or again pinnatifid, sori very small, one in the sinus or upper margin of each segment (rarely more), rachis and costa glanduloso-pilose.—Nephrodium punctilobum, *Mich. Flor. Bor. Am.* ii. *p.* 268. Dicksonia pubescens, *Schkh. Fil. t.* 13. D. pilosiuscula, *Willd. Sp. Pl.* v. *p.* 484 (*not Raddi*). *Hook. Fl. Bor. Am.* ii. *p.* 264.

Hab. United States and Canada, *Michaux and others.* — Very distinct. General appearance resembling *Asplenium Filix-fœmina*, L., but of a pale straw colour when dry, the stipes red-brown. This is the only species of *Dicksonia* yet known to inhabit temperate or cold climates, and it extends as far north as Canada.

42. D. *appendiculata*, Wall.; everywhere especially beneath piloso-glandular, fronds lanceolate tall much attenuated at the base bipinnate, pinnæ narrow oblong almost linear pinnatifid, the segments oblong entire or bi-trifid the base decurrent on the rachis, sori large globose copious upon the shortened teeth of the segments. (TAB. XXVII. C.)— *Wall. Cat. n.* 65.

Hab. Nepal and Kamoun, *Wallich.* — A most distinct species, in gene-

ral form or outline resembling *D. punctiloba*, but different in the divisions of the pinnæ. The lower pinnæ are very short, numerous on the lower part of the rachis or stipes, and there remote. The name is, no doubt, given from the conspicuous sori on the somewhat contracted teeth, resembling globular appendages. Stipes and rachis brown, glossy, stout.

43. D. *deltoidea*, Hook.; frond deltoid-ovate quadripinnate, pinnules oblong-cuneate pinnatifid, the segments linear obtuse few on a winged rachis, sori terminal upon the shorter segments, rachises (the main one zigzag) costæ and frond (in a slight degree) hairy. (Tab. XXVIII. A.)

Hab. Ceylon, *Mrs. Genl. Walker*.—Stipes 6—8 inches long, a little rough, glossy brown. Frond 1 foot long, much divided, the segments narrow. Ultimate rachises winged, and the rachis which bears them slightly winged or compressed.—I have received this very distinct species from no other source but that just mentioned.

44. D. *scabra*, Wall.; fronds ovate acuminate bipinnate, pinnæ ovato-lanceolate acuminate pinnatifid deeply and nearly to the rachis, segments with 3—4 teeth or again pinnatifid, sori terminal upon the teeth cup-shaped, upper portion (formed of the lobule of the frond) firm and subcoriaceous, lower more membranaceous, stipes very long, and as well as the rachis scabrous and more or less clothed with long tawny spreading hairs especially at the base of the stipes, costa slightly hairy. (Tab. XXVIII. B.) *Wall. Cat. n.* 2173.

Hab. Nepaul, *Wallich*. Assam, *Mrs. Mack*. Northern India, *Mr. Edgeworth*.—A very handsome and distinct species, with a long, creeping, hairy caudex. Stipes 1—1½ foot in length, chestnut-coloured. Fronds scarcely a foot long, pale stramineous green, occasionally slightly hairy.

45. D. *cuneata*, Hook.; glabrous, fronds ample spreading 4-pinnate, pinnules broadly rhomboid-ovate from a winged rachis very obtuse the cuneate base tapering into a footstalk lobato-dentate subpinnatifid, the lower lobe above the largest, sori in the axil of the teeth or lobes solitary. (Tab. XXVIII. C.) Sitolobium cuneatum, *J. Sm. En. Fil. Philipp. p.* 418, (*name only*).

Hab. Luzon, Manilla, *Cuming, n.* 31. — A handsome species, and well marked by the copious, rhomboid-ovate, very obtuse pinnules, slightly lobed and auriculate, tapering into a short petiole, and arising from a narrow winged rachis.

46. D. *Smithii*, Hook.; fronds tripinnate ample spreading, pinnæ large lanceolate acuminate firm caudate deeply pinnatifid to the costa, segments or pinnules ovato-lanceolate cuneate at the base toothed or dentato-pinnatifid narrower in the fertile fronds, sori in the axils of the teeth or ultimate segments solitary, primary and secondary rachis very straight stout rigid and as well as the costa and veins pubescenti-

glandulose. (TAB. XXVIII. D.)—Sitolobium flaccidum, *J. Sm. En. Fil. Philipp. p.* 418, *excl. syn.* (*name only*).

Hab. Luzon, Manilla, *Cuming, n.* 108, 145 and 222.—This well-marked plant agrees neither with the description nor figure of *D. flaccida*, to which Mr. J. Smith refers it. It is peculiarly rigid, particularly the fertile specimens; the rachises very stout and straight; the primary pinnæ much attenuated into a caudate point; pinnules rigid, with dark brown prominent veins. Barren segments, or pinnules, broader than the fertile ones, and the primary pinnæ less caudate.

Doubtful Species of this Section.

47. D. *obtusifolia*, Willd.; "frond pinnate, pinnæ pinnatifid, segments ovato-oblong roundish obtuse inciso-dentate." *Willd. Sp. Pl.* v. *p.* 483. Patania obtusifolia, *Pr. Pterid. p.* 138, *t.* 5, *f.* 14.—Hab. Caraccas, *Bredemeyer.*—Willdenow observes, "ab omnibus fronde bipinnatifida laciniis margine rotundatis diversa."—This, if a distinct species, should perhaps be placed near *D. adiantoides*, and the solitary lobe, figured by Presl, is not unlike some of the lobes of that species.

48. D. *strigosa*, Sw.; "fronds bipinnate, pinnæ ensiform pinnate rhombeo-oblong rather acute incised, segments obovate dentate, stipes and rachis pubescent." *Sw. Syn. Fil. p.* 128. *Willd. Sp. Pl.* v. *p.* 484. Trichomanes strigosum, *Thunb. Jap. p.* 539.—Hab. Japan, *Thunberg.*

(D. "*glutinosa*, Wall." (*according to J. Sm.*). Sitolobium glutinosum, *J. Sm.* (*name only*). E. Indies, *Wallich.*—I do not find such a species anywhere noticed by Wallich).

49. D. *Domingensis*, Desv.; "pinnæ petiolate, pinnules lanceolate acute cuneate at the base ultimate ones coadunate, inferior ones subpetiolate subauriculated above pinnatifido-lobate, lobes broad acute remotely serrate, fertile ones crenato-serrate, caudex frutescent." *Desv. Fil. in Mém. Soc. Linn.* ii. *p.* 317.—Hab. "Hispaniola."

50. D. *multifida*, Sw.; "fronds triplicato-pinnate, primary and secondary pinnæ acuminate, pinnules lanceolate obtuse pinnatifid, segments bidentate, veins hairy on both sides, stipes and rachis pubescent." *Sw. Syn. Fil. p.* 137. *Willd. Sp. Pl.* v. *p.* 489. *Pr. Reliq. Hænk. p.* 68.—Hab. East Indies (*Willd.*)—Willdenow brings under this his "*Cœnopteris Japonica*, Phyt. p. 14, t. 8, f. 1, excl. syn.," which Mr. Brown refers to his *Davallia flaccida*, as perhaps a variety of it, and, certainly, a species of *Davallia*.

51. D. *millefolium*, Desv.; "pinnules attenuate sub-caudate ultimate ones oblong deeply pinnatifid cuneate at the base auricled above, segments subtridentate obtuse uncinate,

rachis pruinoso-pubescent, that of the pinnules slightly margined." *Desv. l. c. p.* 318.—Hab. E. Indies.

8. CIBOTIUM, *Kaulf.*
Pinonia, *Gaudich.*

Sori at the very margin and projecting from it, pointing downwards, always from the apex of a vein. *Involucre* subglobose or reniform, coriaceous or horny, 2-valved, generally unequally so, outer valve not formed of the substance of the frond, inner one smaller and operculiform. *Receptacle* a little elevated. *Capsules* stipitate, with a nearly complete ring. —*Tropical or subtropical* Ferns *of the northern hemisphere, inhabiting the* Sandwich Islands, the Philippines, Assam and Mexico, *arborescent in* C. Chamissoi *and* C. Schiedei, (*perhaps in others*); fronds *bipinnate.* Veins *simple or once or twice forked.* HOOK. GEN. FIL. TAB. 25.

1. C. *glaucum*, H. et A.; fronds bipinnate glabrous very glaucous beneath, pinnæ linear-oblong acuminated into a long narrow serrated point deeply pinnatifid to the rachis often pinnate at their base, segments oblong falcate rather acute crenato-serrate especially at the apex, involucres coriaceous numerous 6—12 on each segment or on each ultimate pinnule rather small tawny, the valves unequal, innermost one narrow and elongated, veins once or twice forked, rachis and costa quite glabrous. (TAB. XXIX. A.) — *Hook. et Arn. in Bot. of Beech. Voy. p.* 108, (*excl. syn. Kaulf. et Gaudich.*) Dicksonia glauca, *Sm. in Rees' Cycl. v.* vii. Hiatea *Menz. MS.* (*apud nos*).

Hab. Sandwich Islands, *Mr. Menzies. Lay & Collie* in Beechey's Voy. —Discovered so long ago as 1807 by the venerable Menzies, and described by Sir J. E. Smith in Rees' Cyclopædia. Other species have doubtless been confounded with it. Pinnæ a span long, narrow, much attenuated, subcoriaceous, very glaucous beneath, at the base often again pinnated, veins once or twice forked, rarely if ever simple. I have only seen specimens from Menzies and Beechey's voyage. Mr. Menzies had distinguished this and an allied species in his herbarium under the name of *Hiatea*, and remarked that though now arranged (by Smith) under *Dicksonia*, yet they did not agree with that genus.

2. C. *glaucescens*, Kze.; fronds bipinnate, pinnæ narrow or linear-oblong much acuminate caudate glaucous beneath pinnatifid nearly to the rachis, segments oblong acute serrated subfalcate lower ones sometimes distinct glabrous or slightly arachnoid, involucres solitary one on each side the base of the segments small subcoriaceous glaucous reniform, the valves nearly equal and both transversely oblong convex,

veins simple rarely forked. — *Kunze in Schkh. Suppl. p.* 63, *t.* 31 (*cult.*) Balantium, *Link*, *Fil. H. Berol. p.* 40. "Cibotium glaucophyllum, *Hort. Berol.*" *Presl.* Cibotium glaucum, *J. Sm. En. Fil. Philipp.* (*excl. syn.*) C. Cumingii, *Kze. l. c. p.* 64, (*name only*). C. Barometz, *J. Sm. Gen. Fil.* Aspidium Barometz, *Hort. Angl.*

Hab. Philippine Islands, *Cuming*, *n.* 123. — This is, in many respects, allied to *C. glaucum*, but distinguished by its simpler veins and by the involucres, which besides being of a different form and texture, stand singly, one (very rarely two) on each side at the base of each segment, thus, as Mr. J. Smith remarks, forming a long parallel line on each side the costa and a little remote from it. They are by no means corneous and tawny, but rather coriaceous, approaching to membranaceous and glaucous, broader than long, reniform, the two valves nearly alike in size and form; and the same characters exist on various specimens. Our cultivated ones from the Birmingham Botanic Garden, which are, I believe, identical with the *C. glaucescens*, Kze., are similar to Mr. Cuming's from Luzon, probably the native country of the garden plant, which has by some, but without sufficient authority, been supposed to be the "*Tartarian Lamb*" of Loureiro.

3. C. *Assamicum*, Hook.; fronds bipinnate, pinnæ oblong-lanceolate very much attenuated caudate glaucous beneath deeply pinnatifid almost to the rachis the lower segments remote (but united) all of them linear-oblong very acute subfalcate serrated, involucres subcoriaceous several (4—6) on each segment pale brown the valves unequal inner one narrower, rachis glabrous, costa with arachnoid appressed hairs, veins simple or rarely forked. (Tab. XXIX. B.)

Hab. Assam, *Mrs. Mack.*—Allied to *C. glaucum* and *glaucescens*, differing from the former in the more simple veins and less coriaceous involucres, and from the latter in the different form and texture and unequal valves of the involucres.

4. C. *Chamissoi*, Kaulf.; arborescent, fronds bipinnate, pinnæ lanceolate acuminate subcoriaceous not anywhere glaucous glabrous or beneath (especially on the rachis and costa) clothed with more or less copious arachnoid hairs pinnatifid $\frac{2}{3}$ or $\frac{3}{4}$ down to the rachis, the segments ovate obtuse bluntly serrate, involucres generally copious (6—12) rather small very horny glossy tawny the valves unequal, inner one narrower, veins sunk (not prominent) dark-coloured simple or forked. — *Kaulf. Enum. Fil. p.* 230, *t.* 1, *f.* 14, (*April* 1824). Pinonia splendens, *Gaud. in Ann. Sc. Nat. Dec.* 1824, *and in Freycin. Voy. p.* 370, *t.* 21.

Hab. Oahu, Chamisso, *Gaudichaud*, *Barclay*, *Macrae*. — Truly distinct from all the preceding and from the following species. It is the species on which the genus *Cibotium* was founded by Kaulfuss, and *Pinonia* by Gaudichaud: with the figures and descriptions of both of which it entirely

accords. The hairs, though sometimes copious and cobwebby, are generally deciduous.

5. C. *Menziesii*, Hook.; fronds bipinnate everywhere glabrous thick and coriaceous, pinnæ (large) oblong acuminate sinuato-pinnatifid, the segments or lobes not reaching half-way to the rachis, rounded very obtuse obscurely crenate or rather entire, the sinuses rather wide bearing the fructifications at their base, involucres several on each side and at the base of the sinus corneous opaque large, inner valve smaller and narrower, rachis and simple or forked veins very prominent and pale. (Tab. XXIX. C.)

Hab. Oahu, *Menzies, Lay and Collie* in Beechey's Voy. — This is assuredly a very distinct plant, which had been no doubt confounded with one or other of the described Sandwich Island *Cibotia*. The fronds are the thickest and most coriaceous of all the species, and the pinnæ the largest and broadest, sinuato-pinnatifid, the sori at the base of the sinus running partially up the segments or lobes, and the costa and veins pale and singularly thick and prominent, while the involucres are the largest of the genus and very horny.

6. C. *Schiedei*, Schlecht. et Cham.; arborescent, fronds bipinnate, pinnules (small) lanceolate finely acuminate pinnatifid $\frac{2}{3}$ of the way down with copious long fulvous hairs especially on the costa, segments ovate acute slightly falcate somewhat glaucous beneath serrated, involucres copious small 8—10 on each segment coriaceous tawny transversely oblong the valves nearly equal convex, inner one a little smaller, rachis subarachnoid with woolly deciduous hairs, veins simple or forked. (Tab. XXX. A.)—*Cham. & Schlecht. in Linnæa, v.* v. *p.* 616.

Hab. Hacienda de la Laguna, Mexico, *Schiede and Deppe.* Xalapa, *Galeotti, n.* 6458. Guatemala, *G. U. Skinner, Esq.* — Schlechtendal and Chamisso justly observe that this is a more elegant Fern than any of its congeners. Caudex 10—15 feet high, (Galeotti). The pinnæ are small, 3—4 inches long, much acuminated into a narrow point, slightly glaucous beneath and there clothed with copious long tawny hairs. It is indeed very different from any other species; and has the segments so small that the involucres meet in the centre of them, and nearly cover and conceal the whole surface.

9. Deparia, *Hook. & Grev.*

Dicksonia, *Kaulf. Presl.*

Sori marginal at, and towards, the apices of the segments, on short teeth, pointing forwards, exserted, always from the apex of a vein. *Involucre* shallow and pateriform or cup-shaped and compressed, membranaceous, of a different texture from the fronds (not coriaceous nor herbaceous), mouth entire. *Receptacle* elevated, but short and wholly included

within the involucre, stipitate, with an incomplete elastic *ring*. — Tropical Ferns of the northern hemisphere, *the* Sandwich Islands *and* Peru, *ample, bipinnate*. Fronds *subcoriaceous or membranaceous*. Veins *pinnated, veinlets simple or forked*. HOOK. GEN. FIL. TAB. 44, B.

1. D. *prolifera*, Hook.; fronds ample bi?-pinnate membranaceous glabrous, pinnæ opposite elongated oblong acuminate, deeply pinnatifid nearly to the costa, the segments distant oblong obtuse nearly entire (when barren), involucres on short projecting teeth small pateriform inserted on both sides the segments and towards the apex, veins all simple. D. Macraei, *Hook. et Grev. Ic. Fil. t.* 154. Dicksonia, *Kaulf. En. Fil. p.* 225.

Hab. Oahu, *Chamisso, Lay and Collie* in Beechey's Voyage, *arclay*. Owhyhee, *Macrae*.—Kaulfuss, who first described this handsome plant, observes that its rachis is proliferous, which is not apparent in my specimens.

2. D. *Mathewsii*, Hook.; fronds ample glabrous bipinnate coriaceo-membranaceous, pinnæ alternate or opposite only at the base of the primary divisions oblong from a broad base gradually acuminated deeply pinnatifid to the costa or in the lower ones pinnato-decurrent, segments and ultimate pinnules approximate obliquely broad-ovate very obtuse or abrupt the larger ones lobed and bluntly auricled at the base above irregularly crenate, involucres from the apices of the segments approximate cup-shaped compressed situated on short teeth, veins approximate simple and forked. (TAB. XXX. B.)

Hab. Peru, *Mathews*, *n.* 1782. — Widely different from the preceding, yet, in my mind, confirming the validity of the genus, which I distinguish by having a cup-shaped or pateriform membranaceous involucre, standing forward beyond the margins of the segments upon little teeth, never directed downward or towards the underside. Its nearest affinity is with *Loxsoma* and *Trichomanes*. The capsules, however, are different from both, of the ordinary structure, but situated on very long stalks.

10. LOXSOMA, *Br.*

Sori marginal, pointing forward, but partially sunk in the axil of a tooth or lobe, from the apex of a vein. *Involucres* suburceolate, coriaceous, the outer apparently formed of a changed portion of the frond, the mouth truncated, entire. *Receptacle* columnar, elongated, much exserted beyond the involucre, and covered, for its whole length, with clavate shortly stipitate *capsules*, mixed with jointed hairs and furnished with a broad oblique complete *ring*, opening on one (the out-) side vertically. *Sporules* triangular, with a depressed triangular mark.—*A beautiful* Fern *of* New Zealand.

Caudex *creeping.* Fronds *stipitate, coriaceous, glabrous, decompound, glaucous beneath, the segments lanceolate, dentato-pinnatifid, secondary veins or veinlets simple or forked.* Hook. Gen. Fil. tab. 15.

1. L. *Cunninghami*, Br. MS.; *A. Cunn. in Bot. N. Zeal. in Hook. Comp. Bot. Mag.* ii. *p.* 366, *t.* 31, 32. Davallia dealbata, *A. Cunn. MS.* Trichomanes cœnopteroides, *Harv. MS.*

Hab. New Zealand, northern island, abundant, *A. & R. Cunningham, Mr. Colenso, Dr. Sinclair, J. D. Hooker, and all travellers.* — One of the most remarkable of Ferns, especially in the nature of its fructifications, and rigid fronds. Frond about a foot long, tripinnate, very glaucous beneath. Involucres in a measure connate with the margin of the frond, and resembling that of some coriaceous *Davallieæ*, but they form a complete somewhat urceolate cup. The receptacle is a long exserted column as in *Trichomanes*, covered with hairs and stipitate capsules, which have the broad oblique ring of *Cyatheaceæ*, and exhibit little resemblance to those of *Trichomanes*.

11. Hymenophyllum, *Sm.*

Sori marginal, lateral or terminal, more or less sunk in the frond, or quite exserted, and always terminating a vein or costa. *Involucres* monophyllous, cup-shaped, urceolate, cuneate or orbicular, more or less deeply 2-valved, sometimes to the very base, of the same substance as the frond, or thicker and more compact, reticulated, toothed or entire at the margin. *Receptacle* elongated, frequently columnar, included, rarely exserted. *Capsules* sessile, or nearly so, covering the receptacle wholly or in part, depressed, surrounded by a generally broad, entire, almost transverse *ring*, bursting vertically on one side. *Sporules* (always?) triangular, with a deep triangular depression. —*Small, sometimes minute*, Ferns, *inhabiting rocks or trees or terrestrial, in the tropics and temperate, rarely cold, climates.* Caudex *generally creeping, filiform, slender.* Fronds *more or less stipitate, sometimes sessile, of a singularly delicate, thin, membranaceous, yet strongly reticulated texture, resembling some* Jungermanniæ, *of a dark lurid green color, in drying often turning black or brown, sometimes red-brown, glabrous or hairy, simple and penninerved in one instance, or pinnated, or pinnatifid, and variously divided, generally into narrow oblong or linear obtuse segments, entire or toothed at the margin, with a strong central costa.* Hook. Gen. Fil. tab. 32.

Obs. The present and following genus have been strangely excluded from the true Ferns by Presl; and Endlicher has constituted of them a separate group, *Hymenophylleæ*, chiefly founded upon the complete transverse ring of the capsules, the very much elongated, columnar or filiform receptacle, and the delicate texture of the frond:—but it will be seen by the previous

genus *Loxsoma*, that they possess the important characters of the fructification in a Fern of the more ordinary texture: and it seems to me that they rank quite naturally near that genus; and with respect to the frond, the excellent Link justly remarks of these two genera, "Frons harum Filicum interdum a fronde Polypodiacearum nullo modo differt, in genere vero magis tenera est, et ob cellulas majores magis reticulata apparet, ita ut ad habitum Muscorum frondosorum magis accedant."— The genus *Hymenophyllum* is sometimes with difficulty distinguished from *Trichomanes*. The receptacle is not always included in *Hymenophyllum*, nor always exserted in *Trichomanes*. Again, in the latter genus, there is an approach to a two-lipped involucre, and in the former it can sometimes be scarcely called two-valved.

* *Fronds undivided, dichotomous, or once pinnatifid,§ glabrous. (Sp. 1—4).*

1. H. *cruentum*, Cav.; fronds broadly lanceolate sinuato-dentate penninerved, involucres at the apices of the teeth orbicular-ovate the cuneate base sunk, the lips free entire, receptacle in age a little protruded, stipes very long slender. (Tab. XXXI. A.)—"*Cav. Præl.* 1801, *n.* 684." *Sw. Syn. Fil. p.* 145. *Willd. Sp. Pl.* v. *p.* 516.

Hab. Chiloe, on trunks of trees, *Cavanilles*, *Cuming*, *n.* 5. Woods, Valdivia, *Bridges*, *n.* 794. — Fronds brown when dry in our specimens, not blood-colored.

2. H. *marginatum*, Hook. et Grev.; fronds erect linear-cuneate di-trichotomous, the segments linear obtuse subundulate with a thickened margin, apex emarginate, involucres terminal solitary nearly orbicular, the valves convex free to the base exserted entire with a thickened colored margin. *Hook. et Grev. Ic. Fil. t.* 34.

Hab. Among mosses, Port Jackson, New Holland, *Fraser*, *Bynoe*. — A small and very distinct species. Fronds 1—1½ inch long, 2—3 lines wide, resembling some frondose *Jungermannia*. Stipes 2—4 lines long, hairy at the base, arising from a slender creeping caudex.

3. H. *asplenioides*, Sw.; fronds pendulous oblong-lanceolate pinnatifid rather more than half-way down, the segments entire or bifid oblong obtuse, involucres terminal on the segments orbicular-ovate entire, the short cuneate base sunk the rest free 2-valved, receptacle always included.—*Sw. Syn. Fil. p.* 145. *Lam. Illustr. t.* 8, *f.* 1. *Willd. Sp. Pl.* v. *p.* 516. *Hedw. Fil. cum Ic.*—*β.* fronds broader, segments subpalmate. H. palmatum, *Klotzsch, in Herb. Reg. Berol. et in Herb. Hook.*

Hab. Trunks of trees, Jamaica, *Swartz*, *Bancroft*.—*β.* Brazil, *Sellow*.— Stipes 1—3 inches long: fronds nearly equal in length, sometimes simply

§ *H. asplenioides* has the segments of the fronds occasionally again divided. *H. rarum*, Br., on the other hand, which is sometimes simply pinnatifid, and at other times pinnate and then pinnatifid, will be found among the compound species.

pinnatifid, sometimes almost so much divided as to justify its being placed in the next division.

4. H. *abruptum*, Hook.; small, frond broadly oblong truncated at the apex deeply pinnatifid, the segments spreading linear-oblong entire retuse rarely bifid, involucres terminal orbicular-cuneate almost wholly immersed, the semiorbicular valves short entire, receptacle protruded in age, stipes not winged. (Tab. XXXI. B.)

Hab. Jamaica, *Menzies*, *Purdie*.—I do not find this anywhere described. Caudex creeping, filiform. Stipes slender, half an inch long. Fronds 1½ inch long by 1 inch or less broad, very delicate, thin and membranaceous, deeply pinnatifid, almost to the rachis; segments mostly entire, the upper ones coming to a nearly level top. Involucres almost wholly sunk, cuneate; the short lips forming a half-circle, receptacles much protruded, especially in age.

** *Fronds compound, pinnate, or twice or more pinnatifid, hairy or ciliated,§ entire or rarely indistinctly denticulate. (Sp. 5—28).*

† *Fronds pinnatifidly divided. (Sp. 5—16).*

5. H. *hirsutum*, Sw.; pendulous, clothed with tawny stellated hairs, fronds linear-oblong more or less elongated, pinnatifid, the primary segments short (simple when young) pinnatifid and subflabellate, the segments linear-oblong obtuse mostly pointing upwards and subunilateral, involucres nearly orbicular hairy, the subcuneate base sunk in the frond. —*Sw. Fl. Ind. Occ.* iii. *p.* 1746. *Syn. Fil. p.* 146. *Willd. Sp. Pl.* v. *p.* 517. *Raddi, Fil. Bras. t.* 79, *f.* 3. *Hedw. Fil. cum Ic. Hook. et Grev. Ic. Fil. t.* 84, *(young plants)*. H. venustum, *Desv.* Trichomanes hirsutum, *Linn. Sp. Pl. p.* 1561.

Hab. Jamaica, *Swartz*, *Menzies*, *MacFadyen*, *Purdie*. Trinidad, *Lockhart*, *C. S. Parker*. Organ Mountains, *Gardner*, *n.* 214. Huanuco, *Hænke*. —Stipes generally short, not winged, hairy above. The specimens figured in Hook. et Grev. Ic. Fil. are only young ones, with simply pinnated fronds. Hedwig's plate is very characteristic, as is that of Raddi; for the mature fronds are often a span and more long, flexible, pendulous, the primary segments deeply divided in a fan-shaped manner. Habit resembling that of the pinnated division, but the fronds are throughout pinnatifid, the wing of the main rachis being as broad as that of the costa in this division.

6. H. *ciliatum*, Sw.; fronds oblong-ovate or ovate acuminated bi-tripinnatifid, segments linear obtuse, the margins (chiefly) and the costa with branched hairs, involucres rather broader than the segments free suborbicular obliquely cordate at the base, hairy at the margin of the valves, stipes winged above. — *Sw. Fl. Ind. Occ.* iii. *p.* 1753. *Syn. Fil. p.*

§ *H. Organense* is very indistinctly ciliated, and slightly denticulate, as are two or three others.

147. *Hedw. Fil. cum Ic. Willd. Sp. Pl. p.* 519. *Hook. et Grev. Ic. Fil. t.* 35.

Hab. W. Indies, *Swartz, &c.* Brazil, *Burchell, Sellow, Gardner, n.* 213 *and* 5968. Surinam, *Hostmann, n.* 1232. Mexico, *Ruiz and Pavon, in Herb. nostr.*—Stipes very variable in length, when short, winged almost to the base. Frond 2—6 inches long, varying in diameter. Involucres broader than the segments, rounded but cordate at the base and generally oblique there, one lobe being larger than the other, a character not distinctly represented in our Ic. Fil., nor even by Hedwig, but which yet appears to me very constant.

7. H. *Plumieri,* Hook. et Grev.; frond broadly lanceolate bipinnatifid, costa and margins with stellated ferruginous hairs, primary divisions ovate acuminate pinnatifid half-way down, the segments oblong forked or trifid, involucres suborbicular cuneate the base sunk, the valves free ciliated, stipes with a broad decurrent wing. *Hook. et Grev. Ic. Fil. t.* 123. Filicula digitata, &c., *Plumier, Fil. p.* 73, *t.* 50, B.

Hab. Hispaniola, *Plumier.* Pichincha, Columbia, *Jameson.*—A robust handsome plant, with compact broad primary divisions, less deeply cut than most of the bipinnatifid species. Fructifications numerous, terminating many of the segments and forming an interrupted line round the margin. To this rather than to *H. ciliatum* (surely not to *H. hirsutum*, as Willdenow quotes it) I think Plumier's figure should be referred : — though it must be confessed the two species are very nearly allied.

8. H. *trichophyllum*, H. B. K.; "fronds bipinnate ferrugineo-hirsute, secondary pinnæ dichotomo-pinnatifid, the segments linear nearly entire, rachis hairy terete naked, sori terminal, valves of the involucre semiorbicular hairy." *H. B. K. Nov. Gen. Am.* i. *p.* 22.

Hab. Mountains of Cumana, *Humboldt and Bonpland.* — The authors speak of this as a very elegant species, nearly allied to *H. ciliatum ;* but they observe "frondes pedales? bipinnatæ (aut plus compositæ?)." It might be inferred from the word "bipinnate," used by the authors, this plant should be referred to another division ; but the term is frequently employed by them to express such species as I consider bipinnatifid, that is, they mean bipinnate with the *rachis winged.*

9. H. *Boryanum*, Willd.; hairy especially beneath at the margins with branched hairs, frond ovato-oblong scarcely acuminated bi-tripinnatifid, the segments linear obtuse, involucres suborbicular cuneate at the base and there sunk in the frond, the valves ciliated, stipes short winged above. (Tab. XXXI. C.) — *Willd. Sp. Pl.* v. *p.* 518. *Wall. Cat. n.* 167. *Sieb. Syn. Fil. n.* 139. H. hirsutum, *Bory in Willd.* (*not Sw.*)

Hab. Mauritius and Bourbon, *Bory, Bojer, Carmichael, Telfair, Wallich.* — Fronds small, seldom more than 3—4 inches long, very hairy beneath, much less so above, the primary segments close with blunt apices. Nearly allied to *H. ciliatum*, but the involucres are very different, *never* cordate at the base, but cuneate and partially sunk in the frond.

10. H. *hirtellum*, Sw.; small hairy (especially on the costæ and margin) with fulvous branched hairs, frond ovate oblong slightly acuminate thin membranous but elastic tripinnatifid, the segments narrow linear slightly attenuated obtuse closely placed, involucres ovato-orbicular slightly and obliquely cuneate at the base partially sunk in the frond and a little broader than the segments, the valves ciliated, stipes very slightly winged above hairy to the base. (TAB. XXXI. D.)—*Sw. Syn. Fil. p.* 149. *Willd. Sp. Pl.* v. 519.

Hab. Jamaica, *Swartz*. Wet banks, Fox's pass, St. George's, *Purdie*.—Allied to *H. ciliatum;* but I think quite distinct, in the smaller more compact and generally ovate fronds, the slightly winged and hairy stipes, the differently shaped involucres and the striking elasticity of the frond, in which latter respect it resembles the *H. elasticum* of Mauritius.

11. H. *Chiloense*, Hook.; small tufted, frond lanceolate subbipinnatifid with simple hairs or rarely branched at the base on the margin and under surface, glabrous above, segments broad linear obtuse, involucres axillary free ovate toothed obovato-cuneate, valves semiorbicular deeply ciliated at the margin slightly hispid at the base beneath, stipes not winged glabrous. (TAB. XXXII. A.).

Hab. Chiloe, *Cuming, n.* 8 *and* 12. Valdivia, on trunks of trees in woods, *Bridges, n.* 797. — A small densely tufted species, with rigid costa, broad segments, and the involucres always axillary. The hairs are rigid and appear seated on a minute dark tubercle.

12. H. *Organense*, Hook.; frond tall ample ovato-acuminate tripinnatifid, primary divisions broad-lanceolate acuminated, the segments linear simple or bifid obtuse toothed and as well as the costa obscurely ciliated, involucres at the apices of the frond or of the lower primary divisions copious narrow ovate free 2-valved to the base the valves convex dentate and obscurely ciliated, stipes not winged slightly hairy. (TAB. XXXII. B.)

Hab. Moist shady rocks, Organ mountains, Brazil, *Gardner, n.* 210.—A highly beautiful and very distinct species. Stipes 6—8 inches long; frond 8—10 inches.

13. H. *valvatum*, Hook. et Grev.; fronds oblong-ovate acuminate tripinnatifid, segments broadly linear rather acute simple or forked undulate slightly margined indistinctly ciliated, rachis and costa piloso-hispid, involucres copious upon the upper segments ovate free convex ciliated or naked, stipes not winged.—*Hook. et Grev. Ic. Fil. t.* 219.

Hab. Columbia; trunks of trees, forests of Esmeraldas, at an elevation of 3—4000 feet; and on the descent from Mollituro to Naransal, elevation of 6000 feet, *Jameson, Col. Hall.*—Stipes 2—4 inches, black, destitute of wing. Frond 4—7 inches long. Fructifications large, conspicuous, con-

fined to the upper portion of the frond: the segments which bear them contracted and in some degree changed, marginal hairs deciduous.

14. H. *Beyrichianum*, Kze.; "fronds curved tripinnatifid decurrent into the stipes hairy beneath glabrous above, primary segments ovato-lanceolate curved, secondary oblong, their segments linear obtuse toothed setoso-ciliate, sori terminal, involucres ovate eroso-dentate." *Kze. in Pl. Crypt. Poepp. p.* 108.

Hab. Trunks of trees, Peru, *Poeppig.* "Also found in Sierra d'Estrella by *Beyrich.*—Allied in habit to *H. elasticum*, differing in the unwinged rachis; and to *H. fumarioides*, which has, however, entire margins to the frond, glabrous and the receptacle retuse."

Dubious Species of this Section.

15. H. *microcarpum*, Desv.; "fronds tripinnatifid dilated at the base elongated at the apex puberulous, pinnæ subimbricated and pinnules decurrent, the latter 2—4-partite, the segments linear obtuse toothed setigerous at the margin, sori glabrous minute, rachis and stipes with a winged margin." *Desv. in Mém. Soc. Linn.* iv. *p.* 333. Hispaniola (*Desvaux*). "Stipes 1 inch and more long. Fronds 6 inches; pinnæ 1 inch."

16. H. *capillare*, Desv.; "fronds subtripinnatifid, lower pinnæ remote few, pinnules hairy on both sides subpalmato-pinnatifid, the segments toothed obtuse subcontiguous, rachis sinuose naked capillary and hairy." *Desv. l. c. p.* 333. Trichomanes hirsutum, *Du Pet. Thouars, Fl. Tr. d'Acunha, p.* 34, (*excl. syn.*) — Tristan d'Acunha, *Thouars.* — "Near *Trichomanes trichophyllum*," but the laciniæ broader, more decurrent at the base, according to Desvaux.

†† *Fronds primarily, especially below, pinnatedly divided. (Sp.* 17—28*).*

17. H. *elegans*, Spr.; pendulous linear elongated pinnated, pinnæ decurrent ovato-cuneate deeply pinnated with 3—5 somewhat flabellate segments which are linear-oblong obtuse rather distantly ciliated with long slender forked or stellated hairs, costæ glabrous, involucres nearly orbicular cuneate at the base which is sunk in the frond, valves ciliated with long hairs.—*Spreng. Syst. Veg.* iv. *p.* 133. H. bifidum, *Hook. et Grev. Ic. Fil. t.* 196.

Hab. Brazil, *Sellow.* Surucucho, Columbia, at 5000 feet of elevation, *Jameson.* San Carlos, Peru, *Mathews, n.* 1786.—I possess specimens from the above localities, which retain all their characters.

18. H. *pulchellum*, Schlecht.; fronds pendulous elongated pinnated, pinnæ remote petiolate subrhombeo-ovate acuminated bipinnatifid everywhere clothed with tawny stellated

hairs, segments linear-oblong obtuse, involucres semiorbicular cuneate at the base much sunk in the frond and covered with copious long hairs. (Tab. XXXIII. A.) — *Schlecht. in Linnæa*, v. *p.* 618, (*small and barren*).

Hab. Mexico, *Schiede*, in Herb. Reg. Berol. et in Herb. Hook. Pillzhum, Columbia, on trunks of trees, at an elevation of 13,000 feet, *Jameson*. Jamaica, *MacFadyen*.—A very distinct species. Our Jamaica and Columbia specimens are much longer (sometimes a foot long) than the original ones of Schiede from Mexico; but these latter are barren and otherwise imperfect, scarcely 4 inches long in the fronds, with the pinnæ approximate and the segments closely placed. The former have the pinnæ distant, longer, especially the sterile ones, more deeply divided, with more spreading segments, and these only bear fructifications.

19. H. *sericeum*, Sw.; everywhere ferrugineo-sericeous, fronds pendulous much elongated narrow oblong truncated at the apex especially the younger ones, pinnæ lanceolate approximate obtuse cuneate at the base (much attenuated in the fertile ones) laciniato-pinnatifid but not deeply so, veins forked close parallel lamellated, involucres small on the apices of the ultimate segments orbicular sunk very hairy.—*Sw. Prodr. p.* 136. *Willd. Sp. Pl.* v. *p.* 517. *Hedw. Fil. cum Ic.* — H. tomentosum, *Kze. Pl. Crypt. Poepp. p.* 107. H. plumosum, *Kaulf.*—Trichomanes pendulum serici villosi, instar molle, *Plum. Fil. p.* 56, *t.* 73.

Hab. Martinique, *Plumier*. Jamaica, *Swartz, &c.* Peru, *Poeppig, Mathews, n.* 1090, 206 and 1792. Columbia, *Hartweg, n.* 1506, *Jamaica*. Guatemala, *Hartweg, n.* 862. Brazil, *Sellow, Gardner, n.* 215, *Burchell*. — Perhaps the most splendid species of the genus, of great length, 1½ foot to 2 feet long, pendent, soft and flexible, 3—4 inches broad, set with closely placed pinnæ for almost the whole length, and these are black and more or less decayed below, but towards the apex bright-colored and perfect and clothed with rusty copious hairs. The ample fronds cover the faces of rocks, according to Mr. Gardner, as with a curtain. The curious lamellæ of the veins have, so far as I know, been entirely overlooked by authors. The stipes is short, filiform.

20. H. *interruptum*, Kze.; fronds elongated pinnate, above pinnatifid, primary divisions and segments ovato-lanceolate cuneate at the base pinnatifid about half-way down the segments entire or bifid obtuse, margin and costæ with rufous stellated rather distant hairs, lamellæ none, involucres suborbicular cuneate at the base almost wholly sunk in the apices of the segments with blunt rounded valves very hairy. (Tab. XXXIII. B.) *Kze. in Pl. Crypt. Poepp. p.* 107.

Hab. Woods, Pampayaco, pendulous from the trees, *Poeppig*. Descent from Mollituro to Naransal, *Jameson;* 6000—9000 feet. — Stipes very short. Fronds 1—1½ foot long, pinnate below, the rest pinnatifid. Habit similar to that of *H. sericeum*, but less hairy, not at all silky, pinnatifid for a great part of the length, and the veins not at all lamellated.

21. H. *pyramidatum*, Desv.; "frond pinnate piloso-subtomentose on both sides, pinnæ elongate acute cuneate at the base subadnate repando-dentate obscurely denticulate, rachis winged, stipes terete subglabrous winged above." *Desv. in Mém. Soc. Linn. Par.* ii. *p.* 332.

Hab. "Warm parts of America," *Desvaux.* "Frond about 1 foot long." —Probably a variety of *H. sericeum.*

22. H. *elasticum*, Bory; fronds ovate acuminated thin and membranaceous but rather rigid and highly elastic bi-tripinnatifid above below pinnate, pinnæ bipinnatifid, the segments narrow-linear obtuse ciliated as well as the costa, involucres very small semiorbicular, the base cuneate and sunk, valves short ciliated, stipes not winged more or less hairy.— *Willd. Sp. Pl.* v. *p.* 520. *Sieb. Syn. Fil. n.* 78. *Hook. et Grev. Ic. Fil. p.* 135.

Hab. Mauritius and Bourbon, *Bory*, *Bojer*, *Sieber*. — This species well deserves its specific name; for when dry, at least, the sides become recurved, and it is hardly possible to keep the specimens flat except by pressure. Sori very small and the valves of the involucre peculiarly short.

23. H. *Berteroi*, Hook.; fronds oblong ovate or lanceolate moderately attenuated clothed with tawny silky stellated hairs pinnated below bi-tripinnatifid above, pinnæ and primary divisions approximate ovato-lanceolate obtuse or acuminated more or less deeply pinnatifid, the segments broadly linear obtuse, veins not lamellate, involucres very small suborbicular sunk very hairy, stipes elongated hairy terete not winged. (Tab. XXXIII. C.)

Hab. Mountains of Juan Fernandez, *Bertero*, *n.* 1540. Chiloe, *Cuming*, *n.* 11. — Stipes 3—5 inches long. Fronds 4—6 inches, in general aspect approaching *H. sericeum*, but acuminated, smaller, veins not lamellate, involucres much smaller and shorter. One of my specimens is so deeply divided as to resemble *H. elasticum*, but the lower portion of the frond is clearly pinnated, and the surface, as well as the costæ and margin, covered with copious tawny stellated hairs.

24. H. *obtusum*, Hook. et Arn.; small, fronds cæspitose broadly oblong very obtuse tripinnatifid pinnated below, pinnæ or primary divisions approximate cuneate pinnatifid and subflabelliform, segments narrow linear, margins and costa clothed with long branched hairs appressed to the frond, involucres on the ultimate segments equal in breadth to them nearly orbicular, their base broadly cuneate sunk, the valves much ciliated. (Tab. XXXIII. D.)

Hab. Oahu, *Lay & Collie*, in Beechey's Voyage. — Stipes very slender, short, not winged, hairy. Plant small and tufted. Fronds 2 inches long glossy; ultimate segments as it were corymbose, so as to form a blunt and broad extremity. Hairs copious, confined to the costa and margin, many

lying flat over the surface of the frond. Some of the fronds, it may be observed, are wholly pinnatifid, others pinnate below.

25. H. *æruginosum*, Carm.; clothed with branched tawny hairs, fronds oblong or ovato-acuminate tripinnatifid pinnate below, pinnæ or primary divisions ovate acuminate subcuneate, the segments close compact often almost imbricated linear obtuse, involucres smaller than the segments semiorbicular the base cuneate sunk, valves very hairy, stipes not winged. (Tab. XXXIV. A.) — *Carm. in Linn. Tr.* xii. *p.* 573. Trichomanes æruginosum, *Thouars.—Poiret, Encycl.* viii. *p.* 76.—*β. Franklinianum;* primary divisions and pinnæ more distant and rather more acuminate. H. Franklinianum, *Colenso in Tasm. Phil. Journ.*

Hab. On rocks, Tristan d'Acunha, *Thouars, Bory, Carmichael*—*β.* New Zealand, Dusky Bay, *Menzies.* Pendulous on the trunks of trees, Waikare, northern island, *W. Colenso, Esq. n.* 272.—Stipes hairy, shorter than the frond, which is 4—5 inches long. In the color of the dried specimens there is nothing to justify the specific name. The species resembles small specimens of *H. ciliatum;* but the lower portion of the frond is clearly pinnated, and the involucres are different.

26. H. *lanceolatum*, Hook. et Arn.; fronds lanceolate pinnated, pinnæ ovato-lanceolate bipinnatifid distant, the segments narrow-linear obtuse erecto-patent, the margins hairy, hairs erect simple or branched, rachis winged above, involucres terminal on lateral segments orbicular almost free ciliated with long hairs, stipes not winged hairy. (Tab. XXXIV. B.) *Hook. et Arn. Bot. of Beech. Voy. p.* 109.

Hab. Oahu, Sandwich Islands, *Lay & Collie, Douglas, Diell.*—A rather small, apparently pendent, species, becoming of a dark chestnut brown when dry, with lanceolate fronds 3—4 inches long, erecto-patent, divisions and segments, which are rather distant, fringed with appressed hairs. Involucres scarcely at all sunk, ciliated with long hairs.

27. H. *Lindeni*, Hook.; large, downy and ciliated (but not densely) with scattered stellated hairs, fronds broadly ovate acuminate bi-tripinnatifid pinnate below, the pinnæ or primary divisions lanceolate much acuminated, segments linear obtuse, involucres smaller than the segments semiorbicular the base slightly cuneated and sunk, the margin ciliated with rather long hairs, stipes stout long very hairy especially above, not winged. (Tab. XXXIV. C.)

Hab. Caraccas, *Linden, n.* 173.—A large species. Stipes 6—8 inches long; frond nearly the same, or longer, broadly ovate. The greater size and pinnated fronds and long stipes well distinguish this from *H. ciliatum;* add to which the fronds are hairy all over, though not densely; and the involucres are much smaller, not cordate at the base, but rather cuneate and partially sunk in the frond.

Dubious Species of this Section.

28. H. *Arbuscula*, Desv.; "fronds oblong pinnate somewhat hairy, pinnæ decurrent oblong rather obtuse remote pinnatifid, the segments very obtuse ciliated stellate, rachis and stipes hairy marginately winged." *Desv. l. c. p.* 332.—Hab. Mauritius.—"Stipes 2 inches long; frond of the same length." *Desv.*

**** Fronds decompound, the margins toothed or serrated, not hairy nor ciliated. (Sp. 29—47).*

† *Fronds pinnated especially below. (Sp. 29—36).*

29. H. *Tunbridgense*, Sm.; procumbent densely matted, fronds small rather tender pinnated, pinnæ distichous subvertical pinnatifid, segments linear simple or bifid and as well as the supraaxillary solitary subcompressed involucres spinuloso-serrate the valves semiorbicular, the very short cuneate base sunk, rachis winged above. *Sm. Fl. Brit. p.* 1141. *E. Bot. t.* 162. *Schkuhr, Crypt. t.* 135, *d. Sw. Syn. Fil. p.* 147. *Willd. Sp. Pl.* v. *p.* 520. H. minimum, *Rich. Fl. Nov. Zeal. p.* 91, *t.* 14, *f.* 2. *A. Cunn. Fl. Nov. Zeal. in Comp. to Bot. Mag.* ii. *p.* 369. H. revolutum, *Colenso in Tasm. Phil. Journ.* H. asperulum, *Kze. Pl. Crypt. Poepp. p.* 109. H. Thunbergii, *Eckl. in Schied. Pl. Exsic. Cap. Un. It. n.* 92. "H. unilaterale? *Willd.*" *(according to a specimen from Martius, it is this species).*—β. frond elongated, pinnæ more distant and more rigid. H. cupressiforme, *Lab. Nov. Holl. p.* 102, *t.* 250, *f.* 2. *Willd. Sp. Pl.* v. *p.* 522. H. Tunbridgense, *Br. Prodr.*

Hab. Europe, northern or alpine or subalpine districts. Azores, *Guthnic.* Madeira. Cape of Good Hope. Mauritius, *Carmichael.* Chili, *Beechey &c.* Valdivia, *Bridges n.* 798, *Poeppig, D'Urville.* Brazil, *Martius.*—β. Tasmania, New Zealand, Cape of Good Hope. Organ Mountains, Brazil, *Gardner, n.* 212.—Mr. Brown rightly determines the *H. cupressiforme* of Labillardière to be our *H. Tunbridgense*, or but a trifling variety. The species indeed seems to be an inhabitant of various parts of the globe, in the old and new world, in the northern and southern hemisphere. In the Organ-mountain specimens, and in some, but not all, from *Tasmania*, the involucres are nearly entire, and scarcely distinguishable from those of *H. Wilsoni.* Poeppig refers our *H. Tunbridgense* from Chili to his new species, *H. asperulum*, but his *asperulum* quite accords with the European *Tunbridgense.*

30. H. *Wilsoni*, Hook.; fronds rigid pinnate, pinnæ recurved subunilateral wedge-shaped in circumscription pinnatifid, the segments linear undivided or bifid spinuloso-serrate, involucres supraaxillary substipitate solitary ovate inflated entire the rachis generally free to the base. *Hook. in Brit. Flor. Wils. in E. Bot. Suppl. t.* 2686, (*excellent*).

H. unilaterale, *Willd. Sp. Pl.* v. *p.* 521 (*according to description, but not according to a specimen from Martius*). H. Tunbridgense, *β. Kze. in Arot. Afr. Austr. p.* 7. H. peltatum, *Desv. l. c. p.* 33. Trichomanes peltatum, *Poiret*, in *Encycl. Bot.* viii. *n.* 521, *an* H. dentatum, *Cav.?* — *β.* valves of the involucres combined below. — *γ.* segments narrower, involucres smaller.

Hab. Mountains and wet rocks, England, Scotland and Ireland. Cape of Good Hope, Bourbon, &c.—*β.* Chiloe, *Cuming*, *n.* 16.—*γ.* Chiloe, *Cuming*, *n.* 19 *and* 17. Valdivia, Bridges, *n.* 798. Tasmania, *Gunn.* Cape Horn, Hermite Island, *J. D. Hooker*.—The differences between this and *H. Tunbridgense* are detailed with great precision by Mr. Wilson in the 'Supplement to English Botany' above quoted: but great though they are in the respective forms of our own country, it often becomes difficult accurately to distinguish the exotic ones: and it is singular that in almost every country where one species is found, the other is found also.

31. H. *Peruvianum*, Hook. et Grev.; fronds oblong-lanceolate pinnate, pinnæ pinnatifid, the segments broadly linear obtuse spinuloso-serrate, the lowermost forked, involucres supra-axillary obovate semivalvate sessile situated at the inner bases of nearly all the pinnæ spinuloso-serrate at the apex, rachis winged above. *Hook. et Grev. Ic. Fil. t.* 208.

Hab. Trunks of trees, Province of Esmeraldas, elevation of 5000 feet, *Jameson.*

32. H. *pectinatum*, Cav.; fronds linear-lanceolate elongated pinnate, pinnæ curving upwards pinnatifid only on the upper side, hence the segments are all secund, erect, the segments linear obtuse toothed chiefly towards the apex, involucres occupying the apices of all the segments of the superior pinnæ ovate entire at the apex 2-valved to the base broader than the segments, rachis winged above, stipes terete smooth. (Tab. XXXIV. D.)—*Cav. Præl.* 1801, *n.* 687. *Sw. Syn. Fil. p.* 146. *Willd. Sp. Pl.* v. *p.* 425.

Hab. San Carlos de Chiloe, *Cavanilles*. Chiloe, *Cuming*, *n.* 3 *and* 18. Woods, Valdivia, *Bridges*. Chronos Archipelago, *Darwin*.—A very distinct and beautiful species, apparently peculiar to the more southern regions of Western South America. The character of the toothing of the segments, which is very conspicuous in the sterile portions, appears to have been overlooked by authors; the fertile ones are nearly entire.

33. H. *Jamesoni*, Hook.; thin and membranaceous very flaccid pendent, fronds linear-oblong elongate attenuated pinnate, pinnæ remote ovate pinnatifid, the segments linear obtuse dentato-serrate, rachis flexuose winged above and as well as the costæ beneath crested with soft membranaceous spines, involucres solitary axillary sessile broadly obovate compressed spinoso-serrate 2-valved almost to the base, stipes short slender capillary glabrous. (Tab. XXXV. A.)

Hab. Andes of Colombia, above Quito, *Prof. W. Jameson*, *n.* 106. — An elegant, graceful and very distinct species, which deservedly bears the name of an able and most industrious naturalist. Caudex creeping, very slender, rooting, capillary as well as the stipes, which is about 2 inches long. Frond often a span and more long, an inch wide in the broadest part, very delicate, thin and membranaceous; the rachis and costa beneath singularly beset with long, conspicuous, soft, spine-like processes. Whole frond of a greenish colour when dry.

34. H. *Smithii*, Hook.; erect, fronds oblong acuminate narrow at the base pinnate (dark brown); pinnæ bipinnatifid lanceolate acuminate, segments linear flaccid spinuloso-dentate rather obtuse, involucres sessile axillary oblong ovate almost lanceolate rather acute entire 2-valved only half-way down, receptacle exserted in age, rachis often crinite winged above very slightly so towards the base, stipes elongated terete glabrous. (Tab. XXXV. B.) — H. bivalve, *Sm. En. Fil. Ins. Philipp. in Hook. Lond. Journ. Bot.* ii. *p.* 418, (*not Swartz*).

Hab. Philippine Islands, *Cuming*, *n.* 221 *and* 264. — This is not the *H.* (*Trichomanes*) *bivalve* of Forster in the Banksian herbarium; the involucres and other characters being widely different. From *H. multifidum* it equally differs in form and size, in the more delicate texture and acute involucres. Its nearest ally is perhaps *H. fucoides*, but the involucres are very dissimilar. Stipes 3—4 inches long; fronds 4—6 inches or more. In Cuming's *n.* 264 the segments are rather broader and the involucres larger than in *n.* 221; but there appears no other mark of distinction.

35. H. *Bridgesii*, Hook.; erect, fronds broadly ovate acuminate bipinnate, pinnules subdeltoid pinnatifid, the segments narrow-linear obtuse rather rigid somewhat crisped when dry spreading dentato-serrate, involucres axillary or supraaxillary sessile copious roundish-obovate entire or obscurely toothed 2-valved about two-thirds of the way down, the valves convex, rachis and very elongated stipes hispid, the rachis only slightly winged towards the apex. (Tab. XXXV. C.)

Hab. Valdivia, on trunks of trees, *Bridges*, *n.* 795 *and* 796. Chiloe, *Cuming*, *n.* 9.— One of the most distinct of all the species, being truly bipinnate with very narrow patent segments and copious fructifications. Stipes long (nearly a span), black, setose, especially above as well as the rachis. Frond 3—5 inches high, broad at the base, almost deltoid. It can scarcely be the *H. dentatum* of Cavanilles: or, if it be, the description is very incorrect.

Dubious Species of this Section.

36. H. *dentatum*, Cav.; "caudex creeping, fronds tripinnate, pinnules alternate capillary, clusters of capsules strobiliform." "*Cav. Præl.*" 1801, *n.* 687. *Sw. Syn. Fil. p.* 409. *Willd. Sp. Pl.* v. *p.* 525.

Hab. San Carlos, Chiloe, *Cavanilles.* — Can this be the same with *H. Bridgesii* above described? or may it not be a var. of *H. Wilsoni?* By the term strobiliform capsules is probably merely meant their dense arrangement on the elongated receptacle common to almost all the species.

†† *Fronds pinnatifidly divided.*

37. H. *multifidum*, Sw.; erect, fronds broadly ovate tripinnatifid, the segments linear narrow rigid obtuse spinuloso-dentate, involucres sessile supraaxillary obovate obtuse scarcely half bivalved, the lips entire or serrated, receptacles more or less exserted in age, rachis scarcely winged very low down, stipes elongated terete not winged. *Sw. Syn. Fil. p.* 149 *and* 378. *Schkh. Fil. t.* 135, b. *Hook. et Grev. Ic. Fil. t.* 167. Trichomanes multifidum, *Forst.* T. macilentum, *Herb. Banks.*—β. smaller, the fronds curved downwards.

Hab. New Zealand, in woods on the ground, *Forster*, *Colenso*, *J. D. Hooker*, *Sinclair*.—β. Faces of rocks, New Zealand, *Colenso*.—Stipes 3—4 inches long: fronds 2—3 inches; in β. scarcely an inch long.

38. H. *bivalve*, Sw.; fronds erect broadly ovate tripinnatifid, the segments linear rather rigid spinuloso-dentate obtuse, involucres terminal broadly ovate entire 2-valved to the cuneate base which is sunk in the frond, receptacles always included, the rachis but slightly winged below, stipes terete without wing glabrous. (Tab. XXXV. D.) *Sw. Syn. Fil. p.* 146 *and* 372. *Schkh. Fil. t.* 135 (*sterile*). *Willd. Sp. Pl.* v. *p.* 523. Trichomanes bivalve, *Forst.* Hymenophyllum spathulatum, *Colenso in Tasm. Phil. Journ.* Trichomanes Pacificum, "*Hedw. Fil. sine Ic.*" (*my copy wants also the description*).

Hab. New Zealand, *Forster*, *Colenso*. — This is the true *H. bivalve* of Forster, a very little understood plant, though the general character of the frond is well represented in Schkuhr: but his figure is destitute of fructifications, in the situation and form of which the main characters are to be looked for. Its nearest affinity is with *H. multifidum*.

39. H. *dichotomum*, Cav.; erect, fronds ovate or ovato-lanceolate bipinnatifid, the segments broadly linear bi-trifid very thin and membranaceous much waved sharply toothed and plaited, involucres small from the apices of the lower segments oval or suborbicular entire 2-valved half-way down, stipes and rachis with a crisped and undulated membrane above, and as well as the costa, beset with numerous soft membranaceous spines. (Tab. XXXVI. A.) *Cav. Prœl. n.* 688. *Sw. Syn. Fil. p.* 146. *Willd. Sp. Pl.* v. *p.* 524. *Blume, Fil. Jav. p.* 222 ? H. plicatum, *Kaulf. En. Fil. p.* 268.

Hab. Chiloe, *Cavanilles*, *Cuming*, *n.* 10. Juan Fernandez, *Bertero*, *n.* 1543. High mountains of Java and the Moluccas, *Blume*. — A very elegant species. Caudex creeping, 2 feet long. Fronds 5—6 inches, a little longer than the stipes, very delicate and membranaceous. The almost longitudinal plicæ of the segments, together with the soft spines or scale-like processes on the stipes, rachis and costa, afford beautiful characters. It may also be observed that the involucres, even when they appear to contain mature capsules, remain long closed at the mouth: at length they burst into 2 lips or valves half way down. I have quoted the *H. dichotomum* of

Blume with a doubt, thinking it likely to be different from the Chiloan plant (or rather from the plant I take to be the true *dichotomum* of Chiloe); and it seems to me the more dubious because the author does not notice the remarkable spinulose processes which are so conspicuous on the rachis and stipes, and are independent of the ordinary wings.

40. H. *tortuosum*, Herb. Banks.; rigid erect, fronds broadly ovate tripinnatifid, the segments linear narrow more or less undulated and crisped sharply toothed (not plicate), involucres oval and elongated terminal upon the lower segments of the pinnules, their apices ciliato-dentate the valves short contracted at the mouth, rachis and stipes with a crisped tortuous sinuato-spinulose wing. *Hook. et Grev. Ic. Fil. t.* 129. H. nigricans, *Colla, in Act. Taur.* 39, *p* 32, *t.* 62, (*ex Herb. Banks.*)

Hab. Staten Land (not New Zealand as stated by mistake in the 'Icones Filicum'), *Menzies, Dr. Eights.* Tierra del Fuego, *Banks, Solander, Darwin, J. D. Hooker.* Valdivia, *Bridges, n.* 799.—Allied to *H. dichotomum;* but the fronds are not plicate at the margin, and they are of a more rigid texture; the involucres also are longer, distinctly ciliato-spinulose. Distinguished also by the absence of the soft spines on the stipes, rachis and costæ: though the remarkably tortuous nature of the wings on the rachis and stipes gives them at first sight a scaly appearance.

41. H. *attenuatum*, Hook.; tall, fronds narrow-ovate attenuated tripinnatifid, the segments linear scarcely rigid plane (not undulated or plicate) ultimate ones elongated ciliato-dentate, involucres terminal on the segments oblong subcylindrical contracted at the mouth with two short ciliato-dentate valves or lips, wings of the rachis and of the long stipes (where they reach to the base) very tortuous and dentato-spinulose. (Tab. XXXVI. B.)

Hab. Summit of the Organ Mountains, *Gardner, n.* 5950. Chiloe, *Cuming, n.* 6.—Evidently allied to *H. tortuosum*, but much larger (fronds 6—7 inches and stipes nearly the same); and in none of my specimens are the fronds either undulate or plicate; the texture is more membranaceous and tender, the whole plant more flaccid and the margins ciliato- rather than spinuloso-dentate.

42. H. *Neesii*, Hook.; erect small, fronds narrow ovate tripinnatifid, the segments linear often forked, the margins deeply undulate and crisped spinuloso-serrate, involucres solitary supraaxillary oblong subcylindrical spinuloso-dentate at the apex the mouth contracted with two short acute valves or lips, rachis and stipes setose especially at the base broadly winged with a crisped undulated serrated membrane. H. dichotomum, *Nees in Nov. Act. Acad.* 1823, *p.* 127, *t.* 13, *f.* 4, (*sterile*), *not Cav.* Trichomanes Neesii, *Blume, Enum. Fil. Jav. p.* 226. T. aculeatum, *J. Sm. in En. Fil. Philipp.*

Hab. Java, *Blume.* Luzon, *Cuming, n.* 146. — This species, together

with *H. denticulatum*, Sw., Blume, and also Mr. J. Smith, refer to *Trichomanes*, and with some justice, so far as the form of the involucre is concerned, which in them, and indeed in the two preceding species, is almost cylindrical, with 2 very short valves or lips; but the texture is thinner than is common in *Trichomanes*, and the general affinity is rather with *Hymenophyllum*. The present species is small, singularly opaque, as if succulent when recent, and the general appearance not much unlike some small spinous fucoid plant.

43. H. *secundum*, Hook. et Grev.; fronds ovato-lanceolate bipinnatifid, primary divisions somewhat flabellate falcato-recurved, the segments linear secund dichotomous serrated, involucres terminal on short axillary segments oval-oblong somewhat compressed 2-valved half-way down, the valves entire the base sunk, rachis winged its margin entire, stipes terete not winged.—*Hook. et Grev. Ic. Fil. t.* 133.

Hab. Staten Land (not "New Zealand"), *Menzies*. Hermite Island, Cape Horn, *J. D. Hooker*. — A very elegant and remarkable species; primary divisions falcato-recurvate and at the base subpalmate, especially the lower ones; the segments secund and pointing upwards, of a rigid texture, becoming dark brown when dry.

44. H. *cristatum*, Hook. et Grev.; fronds oblong bi-tripinnatifid, the segments rather long linear obtuse sharply serrated with large teeth which exist also on the rachis and veins at the back, involucres supraaxillary large orbicular sessile much broader than the segments the apex and sides sharply spinuloso-ciliate 2-valved to the very base, stipes slightly winged above.—*Hook. et Grev. Ic. Fil. t.* 148.

Hab. On Cayambe, Andes of Quito, on the trunks of trees near the limits of perpetual snow, at 14,000 feet of elevation above the sea, *Jameson*.—Remarkable for its dark brown colour, the long spinulose crests on the back of the rachis, costæ and veins, and the very large orbicular involucres, with beautifully ciliated deep valves. Receptacles globose, large, causing a tumid swelling in the lower half of the valves.

45. H. *spinulosum*, H.B.K.; erect, fronds ovate or ovato-oblong bi-tripinnatifid, primary divisions spreading, segments linear-oblong spinuloso-serrate rigid, involucres subsessile supraaxillary 2—3 together broadly obovate compressed entire 2-valved two-thirds of the way down, stipes slightly winged above crinite.—*H. B. K. Nov. Gen. Am.* i. *p.* 26.

Hab. Between Laguayra and Caraccas, 4—5000 feet of elevation, *Humboldt*. Near Cuenca, Columbia, *Jameson*.—This plant, which I take to be the *H. spinulosum* of Humboldt, has a stout caudex, 3—4 inches long, more or less crinite and slightly winged above. Fronds ovate or oblong-ovate, of a firm texture; the fertile divisions bearing 2 or 3 involucres on greatly reduced segments at their upper base. It differs from *H. fucoides* chiefly in the broader and shorter fronds and in the involucres, which in all my specimens are entire and confined wholly to the upper edge of the frond near the base, and perhaps might safely be united to that species.

46. H. *fucoides*, Sw.; fronds oblong acuminate bi-tripin-

natifid, primary divisions pointing upwards, the segments linear-oblong obtuse serrated, involucres subsessile marginal frequently on both sides the primary divisions oval or obovate dentate serrated compressed 2-valved half-way down, receptacle protruded in age, stipes slightly winged above frequently crinite.—*Sw. Fl. Ind. Occ. p.* 1747. *Syn. Fil. p.* 146. *Willd. Sp. Pl.* v. p. 523. Trichomanes fucoides, *Hedw. Fil. cum Ic.*

Hab. Jamaica, *Swartz*, *Purdie*. Martinique, *Sieber*. Summit of the Organ Mountains, *Gardner*, *n.* 5951. Peru, *Poeppig*. Mexico, (*Kunze*). Caraccas, *Linden*, *n.* 57.—This species is very faithfully represented in Hedwig's Filices.

47. H. *denticulatum*, Sw.; "frond ovate glabrous deeply subtripinnatifid, primary divisions alternate approximate trapezoideo-ovate, secondary divisions cuneiform digitato-pinnatifid, segments linear bifid emarginate sinuato-denticulate, involucres with the mouth 2-lipped, rachis winged above entire, stipes short terete." *Bl.*—*Sw. Syn. Fil. p.* 148 & 375. *Willd. Sp. Pl.* v. *p.* 524. Trichomanes denticulatum, *Blume, En. Fil. Jav. p.* 226. Hymenophyllum humile, *Nees. et Bl. in Nov. Act. Acad.* xi. *t.* 13, *f.* 3, (*sterile*).

Hab. Trunks of trees, Java, *Thunberg*, *Blume*. — I have copied Blume's character of this species as more full than that of Swartz, for I am unacquainted with it myself.

**** *Fronds decompound; margins entire (not hairy nor ciliated).*

† *Fronds pinnatifidly divided.*

48. H. *rarum*, Br.; flaccid pendent, fronds oblong or linear-oblong bipinnatifid, the segments short obtuse erecto-patent broad entire, involucres rhomboid the lower half cuneate sunk the upper forming 2 semicircular entire compressed valves, stipes slender filiform sometimes slightly margined above.—*Br. Prodr. Nov. Holl. p.* 159. Hymenophyllum fumarioides, *Bory in Willd. Sp. Pl.* v. *p.* 526, (*according to Kunze*). *Kaulf. Syn. Fil. p.* 269. *Kunze, Acot. Afr. Austr. p.* 75. H. australe, *Willd. l. c. p.* 527? H. semibivalve, *Hook. et Grev. t.* 83. — β. fronds very short compact imbricated. H. imbricatum, *Colenso, in Tasm. Phil. Journ.* — γ. more elongated and acuminate, involucres narrower.

Hab. Tasmania, *Brown*, *Gunn*, *J. D. Hooker*. New Zealand, *Menzies*, *Colenso*, *n.* 412 *and* 277, *J. D. Hooker*. Chiloe, *Cuming*, *n.* 13 *and* 15. South Africa, *Drège*, *Ecklon*, *Harvey*, *Forbes*, *Carmichael*, *Mund*. Bourbon and Mauritius, *Bory*.—β. Chiloe, *Bridges*. New Zealand, *Colenso*. S. part of Tierra del Fuego, *Darwin*, *J. D. Hooker*. — γ. Ceylon, *Mrs. Gen. Walker*, *Dr. Wight*, *Macrae*. — The normal state of this plant seems to be that figured in the 'Icones Plantarum,' under the name of *H. semibivalve*, and is common in Tasmania, New Zealand and S. Africa: but a shorter and more compact form is also found, which I have indicated as var. β.

With the first, on the authority of Kunze, the Bourbon and Mauritius *H. fumarioides* agrees, for he says it is the same with Cape specimens of Drège. The *H. australe* of Willdenow is probably also identical. In the usual state of the plant, with short primary divisions, the segments are mostly secund, from the upper side, but sometimes there is a different appearance. In one of two specimens of Mr. Cuming's *n.* 13, the fronds are ovate, tripinnatifid, but it is barren and may perhaps prove distinct. His *n.* 15 has at first sight a very different appearance, bearing long narrow branches or primary divisions, each resembling the more usual form of the entire plant; it is also more rigid and wiry. It must be confessed that the species is a very variable one.

49. H. *badium*, Hook. et Grev.; fronds broadly oblong lanceolate obtuse bipinnatifid, the segments short oblong spreading entire obtuse, the lower ones of the primary divisions bifid, involucres few solitary on short lateral segments sessile free orbiculari-reniform convex 2-valved to the very base, quite entire, stipes winged in the upper half. *Hook. et Grev. Ic. Fil. t.* 76, (*not Wall. Cat. n.* 172).

Hab. East Indies, *Dr. Wallich*, probably from Nepal.—All my individuals are of a rich brown colour, the segments short and very broad. The fructifications rare, orbicular, approaching to reniform. Our specimens were received and published in the 'Icones Filicum' before Dr. Wallich appears to have drawn out his celebrated 'Catalogue;' — and the species there noted (but with a mark of doubt as this, *n.* 172) is *H. polyanthos*.

50. H. *caudiculatum*, Mart.; tall erect, fronds lanceolate or ovato-lanceolate acuminate tripinnatifid somewhat glossy, primary divisions lanceolate and as well as the apex of the frond long-caudate especially in the sterile fronds, secondary remote often simple, segments short broadly linear entire spreading obtuse or emarginate, involucres supraaxillary large orbicular free sessile or on very short segments 2-valved to the base compressed entire or slightly erose, rachis prominent from the very broad wings, stipes slender terete broadly winged wings decurrent almost to the base.—*Mart. Pl. Crypt. Bras. p.* 102, *t.* 67, *excellent.*—*β.* wing of the stipes broader and as well as that of the rachis undulato-crisped.

Hab. Brazil, *Martius, Sellow;* Organ Mountains, *Gardner, n.* 211. Chiloe, *Cuming, n.* 4. — *β.* Chiloe, *Darwin.* — Plant from 8—14 inches high. Habit and general appearance similar to those of *H. fuciforme*, but truly distinct, smaller, narrower and less divided, with a more slender stipes and rachis, and hence less rigid. The involucres too are widely different, large and orbicular. Our Chilian specimens are more elongated, rather less divided, and of a paler color. In the Brazilian ones the fructifications are more copious (indeed exceedingly abundant, reaching to the apex of the frond) and then the ultimate segment is abbreviated; otherwise forming a long caudate point.

51. H. *fimbriatum*, J. Sm.; fronds erect ovate subacuminate tripinnatifid, the segments simple or bifid linear obtuse

entire undulato-crisped especially at the rachis, involucres copious all terminal campanulate free sessile 2-valved to the base, the valves somewhat plaited truncate fimbriato-dentate, stipes winged almost to the very base, the wings much crisped. (TAB. XXXVI. C.) — *J. Sm. Fil. Philipp. l. c. p.* 418, *name only.*

Hab. Luzon, *Cuming, n.* 218. — Stipes 2—3 inches; frond 4—5 inches. A good deal resembling *H. Javanicum*, but the fructifications are very different.

52. H. *fuciforme*, SW.; tall rigid (from the stoutness of the stipes and rachis) erect, fronds broadly lanceolate acuminate tripinnatifid somewhat glossy, the segments broadly linear obtuse rounded bifid or sometimes emarginate ultimate ones attenuated, involucres supraaxillary marginal rarely substipitate very small ovate 2-valved to the base free, the valves entire, receptacles in age and even the capsules from the spreading of the valves exserted, rachis with a very broad wing, stipes (pale-colored) stout compressed almost sulcate when dry strongly winged above. (TAB. XXXVI. D.) *Sw. Syn. Fil. p.* 148. *Willd. Sp. Pl.* v. 529. H. fucoides, *Cav. Præl.* 1801, *n.* 686 (*not Swartz*).

Hab. Chiloe (*Cavanilles*) *Cuming, n.* 7. Shady woods, Valdivia, *Bridges, n.* 793. Trunks of trees in mountain woods, Juan Fernandez, *Bertero, n.* 1841. — This is unquestionably the finest and most striking species of this beautiful genus of Ferns. Specimens from Bertero are more than 2 feet long, the stipes one-third of that length, and, as well as the rachis, peculiarly stout, so as to give a firm rigid character to the entire plant. The leafy or winged portion of the rachis is very broad; the ultimate segments are acuminated; the involucres always lateral and resembling the siliculæform fruit of many *Algæ*, — and, what is remarkable, even before the full maturity of the fructification, while the capsules are upon the receptacle, they are exposed to view by the spreading and shrinking of the valves. Its affinity is with *H. dilatatum.*

53. H. *pulcherrimum*, Colenso; rather large erect, fronds ovato-lanceolate tri-quadripinnatifid, the segments rather short somewhat spreading entire linear obtuse bifid, the margins waved, secondary rachis flexuose, involucres sessile axillary or on very short segments small orbicular quite free 2-valved to the very base, the valves convex entire, receptacles included, stipes compressed winged to the base and as well as the rachis of the same color with the frond. (TAB. XXXVII. A.)—*Colenso in Tasm. Phil. Journ.*

Hab. Trunks of trees, Waikare lake, N. Zealand, *Colenso.*—Stipes 3—5 inches; frond 8—10 inches, 4—5 inches broad. In the pale color of the rachis and stipes, in the compressed and strongly winged character of the latter, and in the almost equal size of the entire plant, this has a great affinity with *H. dilatatum*: but the fronds are very different, of a soft and flaccid nature,

subundulated, the segments shorter, more spreading, narrower, not at all palmate. The color is not so green; the involucres are much smaller, never terminal on the longer segments, and not at all sunk.

54. H. *dilatatum*, Sw.; tall erect, fronds ample ovate acuminate or oblong tripinnatifid, primary divisions ovato-lanceolate and as well as the secondary segments broad and subpalmate below, the segments broad-linear elongated subcaudate and drooping entire, involucres terminal on the segments orbicular lower half cuneate sunk in the frond and broader than the segments, the valves slightly convex semi-orbicular very obtuse entire, receptacles clavate included, stipes ancipiti-alate decurrent almost to the base and as well as the rachis green.—*Sw. Syn. Fil. p.* 149 *and* 373. *Schkh. Fil. t.* 135. *Willd. Sp. Pl.* v. *p.* 533. *Hook. et Grev. Ic. Fil. t.* 60. Trichomanes, *Forst. Prodr. n.* 467. *Blume, Enum. Fil. Jav. p.* 221.

Hab. New Zealand, *Forster and other travellers.* Rocks and trunks of trees, woods of Java, *Blume.* — A very handsome species, well represented in the 'Icones Filicum,' except that in most specimens the bases of the segments are so united as to be broad and subpalmate. Stipes and rachis always of the same pale hue as the frond, which is often a foot or even a foot and a half high.

55. H. *protrusum*, Hook.; fronds pendent oblong-acuminate bi-tripinnatifid flaccid compact, primary divisions ovate acuminate, segments linear obtuse entire, involucres terminal small obovate obtuse the lower half cuneate and sunk, the valves entire, receptacles in age thrice as long as the involucres, stipes terete glabrous slightly winged above. (Tab. XXXVII. B.)

Hab. Realejo, Central America, *Sinclair.* Jamaica; woods above Mount Stewart, *Purdie.* — Stipes 2—3 inches long; fronds about 5 inches, membranaceous. Involucres equal in breadth to the segments, half sunk, the upper half 2-valved and about one-third or one-fourth the length of the old receptacle. Well distinguished by the small size of the involucre, and in age by the exserted receptacle.

56. H. *recurvum*, Gaud.; fronds bipinnatifid flaccid pendent oblong acuminate, primary divisions elongate recurved or erecto-patent dichotomously pinnatifid lower ones distant, the segments simple elongated linear entire, involucres supraaxillary solitary terminal sessile or subsessile (the base immersed and cuneate) oval or subrotund 2-valved nearly to the base compressed slightly serrated rarely entire. (Tab. XXXVII. C.)—*Gaud. in Freyc. Voy. Bot. p.* 576. *Hook. et Arn. in Bot. of Beech. Voy. p.* 199.

Hab. Sandwich Islands, *Gaudichaud, Lay and Collie* in Beechey's Voy. *Macrae, Diell, Douglas.* — Stipes 2—3 inches long; fronds 6—8 inches,

flaccid, varying much in the direction of the segments, sometimes recurved, sometimes pointing upwards; lower primary divisions very remote.

57. H. *crispatum*, Wall.; erect, fronds ovato-acuminate tripinnatifid, the segments linear obtuse generally plane sometimes waved entire, involucres terminal sometimes on lateral segments copious ovate sessile free entire 2-valved to the very base the valves convex, receptacles wholly included, stipes with broad crisped wings almost to the base, wing of the rachis also crisped.—*Wall. Cat. n.* 169. *Hook. et Grev. Ic. Fil. t.* 77.—*β. minus;* fronds contracted oblong, fructifications small.—*γ. majus;* fronds broader, fructifications larger. H. sanguinolentum, *J. Sm. Enum. Fil. Philipp. l. c. p.* 418, (*not Swartz*). —*δ. Tasmanicum;* involucres shorter and broader often geminate and generally very erose. H. flabellatum, *Br. Prodr. p.* 159, (*not Labill.*) H. atrovirens, *Colenso in Tasm. Phil. Journ.*

Hab. Nepal, *Wallich.* β. Ceylon, *Mrs. Gen. Walker.* γ. Luzon, *Cuming, n.* 220. δ. Tasmania, *Brown, Gunn.* New Zealand, *Colenso, n.* 275, *Logan, J. D. Hooker.*—*H. crispatum*, as figured in the 'Icones Filicum,' I possess from Nepal. The Ceylon specimens are smaller, with narrower and copious fructifications, scarcely half the size of the former. Those I call γ. are larger, with the involucres twice the size of β., still more copious, especially at the apices of the ultimate segments. The specimens from Tasmania appear quite to agree with Mr. Brown's *H. flabellatum* (not Labill.), for the slight differences would scarcely justify their being kept distinct. Among my abundant specimens from that country the fronds are more or less crisped, or sometimes wholly plane. The involucres, always terminal on elongated segments, are nearly orbicular in some instances, in others ovate, entire or erose. Mr. Colenso's beautiful specimens from New Zealand (*H. atrovirens*, Col.) have the segments of the fronds almost entirely plane, the involucres smaller and exactly ovate.

58. H. *flexuosum*, A. Cunn.; fronds erect rather rigid broadly ovate almost deltoid tri-quadripinnatifid, the segments narrow linear entire obtuse undulated, involucres rather broader than the segment terminal free orbicular entire 2-valved to the base, the valves convex, receptacles included, rachis as well as the stipes with a broad crisped wing. *A. Cunn. Nov. Zeal. in Hook. Comp. to Bot. Mag.* ii. *p.* 369.

Hab. New Zealand, northern island, *All. Cunningham, Colenso.*—This bears the rounded involucres of *H. Javanicum*, but they have the terminal insertion of *H. crispatum.* The fronds are more deeply and copiously divided than in either, more crisped, especially in the rachis and stipes; and the general habit is different; yet it must be confessed that in many respects it appears intermediate between the two just mentioned.

59. H. *undulatum*, Sw.; pendent, fronds ovate or oblong (small) tri-quadripinnatifid, below sometimes pinnate, primary divisions patent, the segments short oblong spreading entire

emarginate everywhere undulated and crisped dense and compact, involucres rare terminal orbicular free compressed 2-valved to the base entire, rachis with the wings undulate and strongly crisped, stipes slender filiform very indistinctly winged.—*Sw. Prodr. Fl. Ind. p.* 1751. *Syn. Fil. p.* 148. *Willd. Sp. Pl.* v. *p.* 533. *Hedw. Fil. cum Ic.*

Hab. Jamaica, *Swartz*, *Menzies*. Mountains of Andinarca, Peru, *Mathews*, *n.* 1086.—Very distinct. The stipes varies from 1—3 inches. Fronds 3—4 inches long, in every part beautifully and equally undulato-crispate.

60. H. *Javanicum*, Spr.; fronds ovate oblong tripinnatifid, the segments linear obtuse entire and as well as the rachis undulated crisped, involucres copious upon very short lateral segments orbicular convex entire or erose free 2-valved to the very base, stipes with a broad wavy wing extending nearly to the base.—*Spreng. Syst. Veget.* iv. *p.* 132. *Blume, Enum. Fil. Jav. p.* 222. H. crispum, *Nees et Blume in Nov. Act. Nat. Cur.* xi. *t.* 14, *f.* 1, (*not H. B. K.*) H. serpens, *Wall. Cat. n.* 173.

Hab. Pundowa Mountains, N. India, *De Silva (Wallich)*. Assam, *Major Jenkins*. Java, in mountain woods, and in the Moluccas, *Blume*.—This is well figured by Nees and Blume in the work above quoted, though the fronds are a little broader than in our specimens. The species is very near *H. crispatum*, but the fronds are much more crisped, and the involucres are orbicular, not ovate. In some specimens, however, there is an approach to the ovate form. Stipes 2—4 inches. Fronds 3—4 inches.

61. H. *myriocarpum*, Hook.; pendent flaccid, fronds elongato-lanceolate compact tripinnatifid, primary divisions lanceolate gradually smaller at the apex and base, the segments short linear-oblong obtuse entire or retuse moderately spreading, involucres very numerous on short lateral contracted segments broadly orbicular sessile 2-valved to the very base, the valves convex entire, rachis slightly winged above. (Tab. XXXVII. D.)

Hab. Colombia, *Hartweg*, *n.* 1530.—Stipes 2—3 inches long; frond a span long, 1½—2 inches broad where widest, regularly and closely tripinnatifid, very flaccid, rich brown when dry, the fructifications very copious, prominent on the upper side of the fronds, perhaps in consequence of their pendent position. The graceful form and copious fructifications will readily distinguish this species.

62. H. *polyanthos*, Sw.; erect or drooping ovate or oblong tripinnatifid, the segments short entire generally spreading sometimes a little waved and flexuose, involucres terminal ovate or nearly orbicular free or the base slightly sunk deeply 2-valved, the valves convex entire or somewhat erose, stipes terete naked or moderately winged above.—*α.* fructifications mostly terminal on elongated subpalmated segments, involu-

cres ovate slightly sunk in the frond. — H. polyanthos, *Sw. Syn. Fil. p.* 149. *Willd. Sp. Pl. l. c. p.* 531. *Hedw. Fil. cum Ic.* H. abietinum, *Kze. Pl. Crypt. Poepp. p.* 109, *vix Hook.* H. Jalapense, *Cham. et Schlecht. in Linnæa*, v. *p.* 619. H. badium, *Wall. Cat. n.* 172, *not Hook. et Grev.* H. ricciæfolium, *Klotzch, in Herb. Reg. Berol. an Jacq.?* — β. fructifications generally on short lateral segments more or less contracted, involucres broadly ovate or more frequently orbicular free to the base (not sunk).—H. clavatum, *Sw. Syn. Fil. p.* 149. *Willd. Sp. Pl.* v. *p.* 532. *Hedw. Fil. cum Ic. Kze. in Syn. Pl. Crypt. Poepp. p.* 109. H. Jalapense, *Martens et Galeotti, Syn. Fil. Mex. p.* 81. H. sanguinolentum, *Sw. Syn. Fil. p.* 529. *Schkuhr, Fil. p.* 136, *t.* 135, *c.* "*Hedw. Fil. cum Ic.*" (*not in my copy*). *Willd. Sp. Pl.* v. *p.* 529. Trichomanes sanguin. *Forst.* Hymenophyllum villosum, *Colenso, in Tasm. Phil. Journ.* (a subvar. with stipes and rachis very slightly hairy). — γ. fronds larger, fructifications as in *var.* β. H. abietinum, *Hook. et Grev. Ic. Fil. t.* 127.

Hab. *a.* West Indian islands, apparently general. Peru, *Mathews, n.* 1798 *and* 1887, *Hartweg, n.* 1529, *Poeppig.* Mexico, *Schiede and Deppe.* Guiana, *Schomburgk, n.* 509. Surinam, *Dr. Hostmann.* Brazil, *Sellow, n.* 5. Nepal, *Wallich.* Assam, *Major Jenkins*, (the specimens small). Philippine Islands, *Cuming, n.* 384. — β. Jamaica, *Swartz, Purdie.* St. Vincent, *Lansdowne Guilding.* Peru, *Mathews, n.* 207 *and* 1791, *Poeppig.* Mexico, *Galeotti.* Brazil, *Burchell.* Guiana, *C. S. Parker.* Juan Fernandez, *Douglas.* Luzon, *Cuming, n.* 214. New Zealand, *Forster, Colenso, Logan*, (in one of Dr. Logan's specimens the involucres have crested lamellæ). — γ. Pichincha, *Jameson, n.* 65. Chacapoyas, Peru, *Mathews.*— As far as specimens are concerned I have had an ample supply at my command, in various states, of what I cannot but consider, after the most careful investigation, as belonging to one and the same species. An opinion has already been expressed in the 'Icones Filicum,' that the differences between *H. polyanthos* and *H. clavatum*, Sw., were not permanent: and I am confirmed in that opinion by further examination. The extreme states of this species are indeed easily recognized and easily described; but there are various intermediate grades that baffle all attempts to discriminate them specifically. The fronds are not only variable in general form and circumscription, but also in the direction of the primary divisions, sometimes being curved downwards. As to size, the plant varies from 4—10 or 12 inches in length. Small specimens of β., when a little crisped, as they sometimes are, approach the *H. undulatum*, Sw.

63. H. *crispum*, H. B. K.; "fronds bipinnatifid glabrous, the linear segments as well as the winged rachis entire undulated and crisped, stipes rounded slightly hairy, involucres terminal the valves subrotund ciliated." *H. B. K. Nov. Gen. Am.* i. *p.* 60.

Hab. Declivities of Mount Silla de Caraccas, elevation of 6,000 feet, Province of Venezuela, *Humboldt.*

64. H. *erosum*, Bl.; "frond tripinnatifid ovate glabrous, pinnæ alternate subrhomboid-ovate, pinnules ovate triangular digitato-pinnatifid, ultimate segments linear obtuse emarginate and as well as the winged rachis subundulate, valves of the involucre oblong obtuse erose at the apex, stipes winged." *Bl. Enum. Fil. Jav. p.* 221.

Hab. Trunks of trees in woods, Java and Moluccas, *Blume*. — "Differs from *H. demissum*, Sw., which it much resembles, in the shorter pinnæ and form and colour of the valves of the involucres."

65. H. *dædaleum*, Bl.; "fronds tripinnatifid ovato-oblong glabrous, pinnæ alternate approximate rhomboid-oblong cuneiform-pinnatifid, the segments linear bi-trifid and as well as the rachis winged sinuato-undulate, valves of the involucre rounded erose towards the apex, stipes winged above." *Bl. Enum. Fil. Jav. p.* 222.

Hab. Mossy trunks of trees, Province of Bantam, Java, *Blume*.—"Near *H. dichotomum*, Cav. but distinct in the approximate pinnæ, in the segments not being spinuloso-dentate and other characters. Involucres erose at the apex."

66. H. *imbricatum*, Bl.; "fronds bipinnatifid ovate purplish glabrous, pinnæ alternate approximate rhombeo-oblong pinnatifid, segments and pinnules trapezoid incised above and subimbricate, ultimate segments linear obtuse, valves of the involucre orbicular entire, stipes rounded." *Bl. En. Fil. Jav. p.* 220.

Hab. Mossy places, mountains of Java, *Blume*.—"Differs from *H. sanguinolentum* in the subdimidiate pinnules, which are subbipinnatifid only above and subimbricated."

67. H. *ricciæfolium*, Bory in Willd.; fronds bipinnate, pinnæ secund, lower pinnules pinnatifid upper ones tripartite, segments linear obtuse, sori terminal, involucres obovate, rachis winged, stipes margined." *Willd. Sp. Pl.* v. *p.* 531. Adiantum tenellum, *Jacq. Coll. p.* 287, *t.* 21, *f.* 3.

Hab. Bourbon (*Jacquin*). "Stipes 1 inch long, margined; fronds 2—3 inches."—Apparently, judging from the figure, allied to *H. polyanthos*.

Dubious Species of this Section.

68. H. *australe*, Willd.; "fronds bipinnate, pinnules linear obtuse, lower ones bifid, sori terminal, involucres emarginate bidentate, rachis winged, stipes margined." *Willd. Sp. Pl.* v. *p.* 527.

Hab. Tasmania, *Labillardière*.—"Stipes 1½—2 inches; frond 2 inches long. Involucres ovate, emarginate at the apex and obtusely bidentate." *Willd.*—It will be seen that I have already, with a mark of doubt, referred this to *H. rarum*, Br.; but the character of the involucre would seem to point to a very different species, with which I am probably unacquainted:

and yet it is hardly likely that it should not have been rediscovered in Tasmania, through the industry of succeeding botanists.

†† *Fronds pinnatedly divided.*

69. H. *exsertum*, Wall.; flexile pendent, fronds oblong elongate acuminate pinnated, pinnæ rather distant lanceolate acuminate decurrent especially the upper ones pinnatifid but not deeply, segments short linear-oblong obtuse entire simple or bifid, involucres on the upper side of the pinnæ solitary or 2—3 sessile or terminating short segments ovate 2-valved almost to the base compressed, the valves eroso-serrate or nearly entire, rachis stipes and costa more or less crinite with long scattered rufous hairs. (Tab. XXXVIII. A.)—*Wall. Cat. n.* 171. H. densum, *Wall. Cat. n.* 170.

Hab. Nepal, *Wallich.*—A well-marked species. The pinnæ are decurrent, broad and not deeply pinnatifid.

70. H. *capillaceum*, Roxburgh; fronds small elongate pinnated, pinnæ remote narrow-cuneate digitato-pinnatifid, segments few linear oblong a little broader upwards entire simple or bifid, involucres orbicular the base cuneate sunk deeply 2-valved compressed denticulate, rachis filiform slightly winged above glabrous, stipes short. (Tab. XXXVIII. B.) — H. capillaceum, *Roxburgh, in Beatson's Cat. of St. Helena Plants.* H. infortunatum, *Bory, in Duperrey Voy. p.* 284, *t.* 38, *f.* 3.

Hab. St. Helena, on rocks and Tree-Ferns, Diana's Peak, *Menzies, Roxburgh, Bennett, J. D. Hooker, Duperrey.*—A small, slender, graceful plant, 3—5 inches long, with a short, slender stipes and a wavy filiform rachis. A well-marked species in the form of the frond, remote, narrow, cuneato-pinnatifid pinnæ and orbicular and toothed valves of the involucre, which latter circumstance has been entirely overlooked by Bory in the figure given in Duperrey's Voyage.

71. H. *demissum*, Sw.; tall erect elastic, fronds ovato-acuminate pinnate, rachis winged above, pinnæ bi-tripinnatifid, the segments linear obtuse entire pointing upwards, ultimate ones frequently elongated, involucres on the lateral segments small ovate sessile 2-valved to the base compressed, stipes terete smooth. — *Sw. Syn. Fil. p.* 147 *and* 374. *Schkr. Fil. t.* 135, *c. Willd. Sp. Pl.* v. *p.* 528. Trichomanes demissum, *Forst.* "*Hedw. Fil.*"

Hab. Pacific Islands, *Forster.* New Zealand, southern island; Dusky Bay, *Menzies.* Northern island; Bay of Islands, *A. Cunningham, Colenso, J. D. Hooker*, &c. Tasman's Bay, *D'Urville.* Philippine Islands, *Cuming, n.* 212.—This has a stout caudex and a stipes, about as thick as a sparrow's quill, quite terete; the fronds and pinnæ acuminate, sometimes falcato-recurved. Involucres small. Frond 8—10 inches long, stipes nearly as long. Closely allied to *H. polyanthos*, but larger; the lower portion of the frond

I find to be always truly pinnated, the segments more attenuated and pointing upwards; rachis never winged, except above: but these are the only differences perceptible. Cuming's specimen precisely accords with the New Zealand ones.

72. H. *scabrum*, A. Rich.; rigid tall erect elastic, fronds ovate acuminate pinnate, pinnæ bi-tripinnatifid acuminate the segments narrow-linear obtuse entire, involucres terminal small ovate orbicular sessile free 2-valved to the base entire or scarcely denticulate terminal on segments which are slightly contracted at their apices, rachis (and frequently the costæ) and stipes above more or less setose, below the stipes is rough.—*A. Richard, Fl. Nov. Zeal. p.* 90, *t.* 14, *f.* 1.

Hab. New Zealand, *D'Urville, A. Cunningham, Colenso, J. D. Hooker.* —Although this be the *H. scabrum* of Richard, the involucres are in our specimens more ovate than shown in his figure, and scarcely denticulate: indeed the species has a very close affinity with *H. demissum*, but it is more rigid, and more or less setose with harsh coarse hairs, which, under a microscope, are curiously and beautifully jointed. When these hairs fall away, as is the case on the stipes, especially on the lower portion, the surface appears scabrous to the eye and to the touch with copious raised points.

73. H. *reniforme*, Hook.; small, fronds ovato-oblong pinnated rigid laxly cellular, pinnæ pinnatifid decurrent, the segments linear emarginate or the lower ones forked entire, the margins recurved when dry, involucres terminal free broader than the segments reniform 2-valved to the base, stipes very short terete smooth hispid with reddish deciduous hairs. (Tab. XXXVIII. C.)

Hab. Peru, *Mathews, n.* 1783.—A most elegant and very distinct species, growing in dense tufts, with a long creeping caudex which is hairy as well as the short stipes: the latter half an inch to an inch long. Fronds 1—2 inches long; texture firm and rigid, but the reticulations are large in proportion to the size of the plant. The margins are much recurved when dry, so as to make the segments appear exceedingly narrow. Involucres reniform, free, sometimes with the valves a little erose.

74. H. *gracile*, Bory; pendulous, fronds ovato-lanceolate or oblong-lanceolate attenuated subbipinnate, pinnæ remote decurrent pinnatifid or bipinnatifid, the segments linear obtuse frequently bifid entire, involucres subovate the cuneate base half sunk in the frond, the valves compressed entire, stipes cylindrical slender smooth and glabrous.— *Bory in Willd. Sp. Pl.* v. *p.* 527. *Hook. et Grev. Ic. Fil. t.* 198. *Wall. Cat. n.* 7084.

Hab. Mauritius, *Bory, Carmichael, Bojer, Wallich.* — My largest specimens, including the stipes, are 8—10 inches long: the frond is flaccid, the rachis waved, the wings above very narrow. Some states are less divided, smaller, and approach the varieties of *H. rarum* from Chiloe (the *H. fumarioides*, Willd.)

75. H. *axillare*, Sw.; pendent flaccid linear-oblong, fronds bipinnate, primary pinnæ often irregular elongate (as if they were branches), secondary short bipinnatifid, the segments short broad linear emarginate, involucres small orbicular generally upon the lower lateral segments the short cuneate base sunk the rest free 2-valved, the valves semiorbicular entire.—*Sw. Syn. Fil. p.* 148. *Willd. Sp. Pl.* v. *p.* 532. *Hook. et Grev. Ic. Fil. t.* 124.

Hab. Jamaica, on trunks of trees in the mountains, *Swartz, Lunan, Higson and Wiles, Bancroft, Purdie.*—A graceful species, flaccid and pendent; the caudex slender, much branched. Stipes short, the primary pinnæ not unfrequently running out into other fronds or as it were branches of the main frond. Extremely distinct.

76. H. *flabellatum*, Lab.; rather flaccid curved downward, fronds ovate or oblong acuminate pinnate slightly glossy on the surface, pinnæ from a broad cuneate base much acuminate pinnatifid the lower segments frequently palmately divided subflabellate all obtuse or emarginate entire, rachis and costæ pale, involucres terminal chiefly on lateral segments nearly orbicular the lower half immersed the upper free 2-valved compressed the valves entire, stipes terete smooth.—*Labill. Fl. Nov. Holl.* ii. *p.* 101, *t.* 250, *f.* 1, (*not Brown*). *Willd. Sp. Pl.* v. *p.* 526. H. nitens, *Brown, Prodr. p.* 159. *Hook. et Grev. Ic. Fil. t.* 197. — β. smaller, involucres narrower, fronds ovate erect.

Hab. Trunks of trees, Tasmania, *Labillardière, Brown, Gunn, J. D. Hooker, Lawrence.* New Zealand, *Menzies, Colenso, Lesson.*—β. Holes of rocks and roots of trees, New Zealand, *Colenso, J. D. Hooker.*—Doubtless a highly variable plant. Labillardière's figure well represents small specimens. Some of our numerous ones are nearly a foot long and much elongated, which is the common form in Tasmania. Smaller ones are often pilose with fine lax and crisped hairs. The most striking character of the plant is the flabellate or subpalmate form of the lower pinnæ. There is also a slight gloss on the surface, not common in the genus, and a pale rachis and costæ. The involucres are narrower in β.

Dubious Species of this Section.

77. H. *floribundum*, H. B. K.; "fronds bipinnate glabrous, secondary pinnæ dichotomously pinnatifid, segments linear entire retuse, rachis and stipes winged, sori terminal, valves of the involucre ovate." — *H. B. K. Nov. Gen. Am.* i. *p.* 27. —Near Caripe, province of Cumana, *Humboldt.* — "Fronds 3 inches high."

78. H. *ramosissimum*, Hamilt.; "frond ovato-lanceolate tripinnate, pinnæ deeply pinnatifid, segments linear-cuneate generally bifid, sori terminal numerous, involucres entire very short, stipes and rachis terete." *Hamilt. in Don, Prod. Fl.*

Nep. p. 12.—Mountains of Nepal, *Hamilton*.—"Fronds 1—1½ foot high ovato-lanceolate."

79. H. *tenellum*, Don; "frond pinnate, pinnæ alternate pinnatifid, segments linear-oblong obtuse entire emarginate at the base simple or bifid, sori solitary lateral, involucres entire, stipes and rachis winged." *Don. Prodr. Fl. Nep. p.* 12. — Nepal, *Hamilton*, *Wallich*. — "Fronds very thin, 1—2 inches high; habit of *H. Tunbridgense*, but most distinct in the entire, not serrated, segments, in their emarginate apices, entire involucres, in the stipes being winged and in the sori being placed at the apices of the lateral segments."

80. H. *endiviæfolium*, Desv.; "fronds decurrently tripinnate, pinnæ subdistant, pinnules confluently pinnate, segments linear emarginate obtuse undulate crisped, stipes rounded margined at the apex." *Desv. in Mém. Soc. Linn.* ii. *p.* 334.—Peru (*Desvaux*). "Fronds 4—10 inches." The author says nothing about the margins of the segments, whether serrate or entire, nor are the involucres noticed.

81. H. *decurrens*, Sw.; "fronds bipinnate, pinnules oblong-ovate cuneate pinnatifido-lobate, the segments linear obtuse, sori terminal." *Sw. Syn. Fil. p.* 166. *Willd. Sp. Pl.* v. *p.* 530.—Adiantum decurrens, *Jacq. Collect.* ii. *p.* 103, *t.* 2, *f.* 12. Martinique, (*Jacquin*). — This plant is taken up solely on the authority of Jacquin, whose figure is extremely unsatisfactory. A specimen in the Banksian herbarium under this name is *H. protrusum* of the present work.

82. H. *emarginatum*, Sw.; "fronds dichotomously subtripinnatifid oblong, pinnæ decurrent, pinnules bipartite, the segments linear emarginate, terminal ones elongated, sori supraaxillary." *Sw. Syn. Fil. p.* 148 *and* 377. *Willd. Sp. Pl.* v. *p.* 530.—Mountains of Java, *Thunberg*.—"Stipes 2—3 inches long. Fronds half a span. Sori terminal on short segments towards the apex of the frond, globose. Columella (receptacle) included; valves of the involucres subrotund, rather large, erect, connivent. Among the largest of the species, remarkable for its elongated terminal segments."

Dubious Species. Section quite unknown.

83. H. *hygrometricum*, Desv.; "fronds subbipinnated, pinnæ alternate pinnatifid, pinnules incised obtuse, caudex creeping tomentose." Trichomanes nudum, *Poir. in Encycl. Bot.* viii. *p.* 79.—Madagascar, *Thouars*.

84. H. *nudum*, Desv.; fronds lanceolate erect bipinnate, pinnæ alternate pinnatifid, segments linear obtuse ciliato-

pilose, stipes naked hairy. "Trichomanes nudum, *Poir. in Encycl. Bot.* viii. *p.* 73. — Guadeloupe, *Badier.* — Poiret compares this with *Hymenophyllum ciliatum*, Sw., and *H. lineare*, of the same author: but I have seen no authentic specimens.

85. H. *Telfairianum*, Wall. Cat. n. 168. —Mauritius, *Telfair.* — Of this likewise I have received no authentic specimens; nor does it appear to exist among the plants of Dr. Wallich preserved in the Banksian or Linnæan herbaria.

12. Trichomanes, *Sm.*

Didymoglossum, *Desv.* Feea, *Bory.* Hymenostachys, *Bory.*

Sori marginal, lateral, or terminal, sometimes upon a changed frond and forming a spike, free or united or sunk in the frond, always terminating a vein. *Involucres* monophyllous, tubular, subcylindrical, tapering at the base, more or less spreading at the mouth, sometimes two-lipped, of the same texture as the frond or thicker and more compact, entire, rarely toothed or serrated. *Receptacle* elongated, columnar, or more frequently filiform, much exserted, sometimes to a very great length. *Capsules* sessile or nearly so, clothing the base of the receptacle within the involucre, rarely the upper portion also, depressed, surrounded by an entire, broad, nearly transverse *ring*, bursting on one side vertically. *Sporules* 3-angular or 3-lobed; in the subgenus *Hymenostachys* oval.— Ferns *usually of small size, but varying from* 2 *inches to* 2 *feet in length, inhabiting the tropics or temperate climates.* Caudex *generally more or less creeping, filiform or stout, glabrous or tomentose: sometimes apparently wanting.* Fronds *more or less stipitate, sometimes sessile, of a membranaceous rarely subcoriaceous texture, generally loosely reticulated, but occasionally (in* T. reniforme*) very closely and compactly so, the meshes or areolæ mostly placed without order, but sometimes (in* T. membranaceum *and its allies) arranged in lines corresponding with the direction of the venation; generally of a deep green color, darker and brownish or almost black when dry; glabrous or hairy, rarely fringed with scales; simple or pinnated or pinnatifid, and variously divided, with narrow oblong or linear segments, which are incised or usually undivided, entire, seldom toothed or serrate, with a strong costa or vein in the centre: sometimes the veins radiate from the base (as in* T. reniforme *&c.) in a very elegant manner.*— Hook. Gen. Fil. Tab. 31. Tab. 108. (Hymenostachys, *Bory*). Hook. Ex. Fl. Tab. 52. (Feea, *Bory*).

Obs. Closely allied as are the genera *Hymenophyllum* and *Trichomanes*, it is rare that one has a difficulty in recognizing them; and yet it is not easy to point out the characters in few words. In our present genus, *Trichomanes*, the involucres are mostly subcylindrical, narrow-urceolate, the mouth spreading, entire, or cut into two short, usually spreading lips, which, when a little elongated, afford the character of *Didymoglossum* of Desvaux; their texture is firm and subcoriaceous, yet cellular; they are often quite sunk or immersed in the segment of the frond, in two or three instances arranged in distichous spikes. Receptacles filiform and not only exserted, but sometimes very much protruded, so as to be several times longer than the involucre: and, either often varying on the same plant, or, by their great fragility, easily broken away and then apparently short. The fronds are more generally erect, as far as can be judged from the dried specimens, and I am not aware that, except in a very few instances, the margins of the segments are ever toothed or serrated, as is common in *Hymenophyllum*: but the characters now mentioned are not invariably constant. The species are I think more remarkable for beauty of form and delicacy of texture than even those of *Hymenophyllum*.

Subgen. 1. Hymenostachys. *Sterile and fertile fronds dissimilar. Involucres arranged in distichous spikes and connate for their whole length. Sterile fronds with reticulated veins.* Hymenostachys, *Bory.*

1. T. *elegans*, Rudge; tufted, sterile fronds much shorter than the fertile ones broadly lanceolate pinnatifid the segments nearly horizontal lanceolate subfalcate serrated often caudate and proliferous at the apex, veins reticulated, spike broad-linear acuminated constituting a compact membrane, the margins formed by the connate sunk cylindrical involucres.—*Rudge, Guian. p.* 24, *t.* 35, (*excl. the fertile frond of* T. spicatum). *Hook. Gen. Fil. t.* 108, (*not Exot. Fl.*) Hymenostachys diversifrons, *Bory in Dict. Class. Hist. Nat.* viii. *p.* 462, *cum Ic.*

Hab. Guiana, *Martin, Poiteau, Schomburgk, n.* 1030. Gorgona and coast of Panama, and Pacific side of Central America, *Barclay, Cuming, n.* 1127.—Fertile frond or spike 6—8 or 10 inches long, nearly ½ an inch wide, with forked transverse veins and closely united involucres forming the edge on each side, which is again, as it were, fringed with the copious slender elongated filiform receptacles, resembling coarse hairs. Stipes nearly equal in length to the spike. Sterile frond a span long: its stipes 2—3 inches.—A most elegant and remarkable species, first described and figured by Rudge in the work above quoted: but a spike of the following species was unfortunately considered to belong to the same plant, and added to it by the artist. In other respects the representation is excellent. Sometimes the rachis runs out at the apex into a long tail, which roots and becomes proliferous.

Subgen. II. Feea. *Sterile and fertile fronds dissimilar. Involucres arranged in distichous spikes, but free to the rachis for their whole length. Sterile fronds with free pinnated veins.* Feea, *Bory.*

2. T. *spicatum*, "R. Hedw.;" tufted, sterile fronds shorter

than the fertile ones broadly lanceolate pinnatifid, the segments nearly horizontal oblong sinuato-crenate, veins pinnated, spike linear with distichous free urceolate stipitate involucres. — T. elegans, *Rudge, l. c. (in part, spike only). Hook. Exot. Fl. t.* 52. T. spicisorum, *Desv.* T. osmundioides, *Bory.* Feea polypodina, *Bory in Dict. Sc. Nat. cum Ic.*

Hab. Guiana, *Martin.* St. Vincent, *L. Guilding.* Trinidad, *Lockhart.* Guadeloupe, (*Bory*). Woods of Portland, Jamaica, *Purdie.*—General habit of the preceding, one half or two thirds the size. Rachis pinnated, as it were, with closely-placed but unconnected involucres.

3. T. *nanum*, Bory; "fronds pinnated, pinnules ovate, spikes slender." *Bory in Dict. Class. Hist. Nat. cum Ic.*

Hab. Guiana, *Poiteau.* — This I only know from authentic specimens in Mr. Heward's collection, one of which he has been kind enough to give me. It is much smaller than the latter, and differs in the sterile fronds being pinnate, especially below, instead of pinnatifid: the involucres are more remote, less patent, and their rachis is sterile and membranaceous at the apex: while the rachis of the barren frond is often lengthened out into a long creeping and proliferous cauda.

Subgen. III. EUTRICHOMANES. *Sterile and fertile fronds similar or nearly so. Involucres never spicate.*

* *Fronds entire, lobed or digitate.* (*Sp.* 4.—19).

† *Veins radiating from the base or flabellate, dichotomous, rarely and only very partially reticulated. Caudex creeping.* (*Sp.* 4—8).

4. T. *reniforme*, Forst.; fronds coriaceous almost horny when dry reniform entire with a deep sinus below, the base decurrent on a long stipes, involucres copious crowded marginal terminating almost every vein cuneato-cup-shaped, columella exserted clavate clothed to the top with capsules.— *Forst. Prodr. n.* 462. "*Hedw. Fil. cum Ic.*" *Sw. Syn. Fil. p.* 141. *Willd. Sp. Pl.* v. *p.* 499. *Hook. et Grev. Ic. Fil. t.* 31.

Hab. New Zealand, *Banks and Solander, Forster and all travellers.*—Caudex creeping, very long. Fronds 4—5 inches broad, semi-pellucid, somewhat fleshy when recent. Veins beautifully radiating from the base, rather close, dichotomous, occasionally anastomosing.

5. T. *membranaceum*, L.; caudex creeping tomentose, fronds rather small sessile thin membranaceous suborbicular or obovate and cuneate or cordate at the base, margins entire often deeply incised bordered with double peltate scales, involucres copious sunk cylindrical attenuated below, the mouth 2-lipped, veins flabelliform dichotomous crowded distinct, reticulations minute.—*Linn. Sp. Pl. p.* 1560. *Sw. Fl. Ind. p.* 1724. *Syn. Fil. p.* 141. *Willd. Sp. Pl.* v. *p.* 499. *Hook. Exot. Flora, t.* 76. Filix Hemionitis, &c., *Pluk. Am. t.* 285, *f.* 3. *Plum. Fil. t.* 101, *f. A.*

Hab. West Indian Islands, abundant on the trunks of trees, *Swartz and others.* — Fronds varying much in size, from 1—3 inches long, and often as much broad, cordate or cuneate at the base and sometimes much attenuated, the margin entire or erose or cut and jagged, or more or less deeply incised; the barren plants, more especially, fringed with curious, nearly orbicular, membranaceous, peltate scales, lying flat upon the edge in pairs, one on each side and placed back to back. These are situated between the veins, alternate with them, so that they cannot be supposed in any way to be abortive involucres. Besides the usual flabellate veins of this group, there are intermediate very slender ones, parallel with them, between which the reticulations appear also arranged in lines parallel with them. One of the most delicate and elegant of Ferns.

6. T. *punctatum*, Poiret; caudex creeping tomentose, fronds small imbricating sessile simple orbiculari-cordate or obovate and obtuse at the base shortly petiolate crenato-lobate with marginal stellated hairs, the lobes obtuse, veins compact flabellate dichotomous, involucres few exserted free cylindrical attenuated below the mouth 2-lipped, receptacle a little exserted.—*Poiret, in Encycl. Bot.* viii. *p.* 64. *Kaulf. Enum. Fil. p.* 201. *Hook. et Grev. Ic. Fil. t.* 236.—*β.* base of the frond sometimes cuneate. T. sphenoides, *Kze. in Pl. Crypt. Poepp. p.* 102, (*excl. syn. of Hooker*).

Hab. Martinique, *Poiret.* Guadeloupe, (*Kaulfuss*). Trinidad, *Lockhart.* Gorgona, Pacific side of Central America, *Barclay.* Guiana, *C. S. Parker.*—*β.* Peru, *Poeppig.*—Poeppig's *T. sphenoides*, according to his specimen in my herbarium, only differs from *T. punctatum* in the cuneate base of the fronds.

7. T. *reptans*, Sw.; caudex creeping tomentose, fronds small erect simple cuneato-ovate entire inciso-pinnatifid tapering into an elongated slender stipes, margin with a few stellated hairs, veins flabellate compact dichotomous, involucres few exserted cylindrical attenuated below 2-lipped at the mouth, receptacles included. — *Sw. Fl. Ind. Occ. p.* 1727. *Syn. Fil. p.* 142. *Willd. Sp. Pl.* v. *p.* 501. *Hedw. Fil. cum Ic. Hook. et Grev. Ic. Fil. t.* 32.—T. hymenodes, *Hedw. Fil. cum Ic.?* Phyllitis scandens &c. *Sloane, Jam.* i. *t.* 27, *f.* 1.

Hab. Jamaica, *Swartz, Macfadyen.* St. Vincent, *L. Guilding.* Cuba, *Poeppig.*—Scarcely exceeding an inch or an inch and a half high, including the stipes, and allied to *T. punctatum*, especially to var. *β.*, but distinguished by the long slender stipes. The figures in Hedwig's Fil. above quoted, it must be confessed, are both of them very unsatisfactory: the central costa represented would induce me to refer them to *T. muscoides*; but the prominent involucres indicate a greater affinity with *T. reptans.*

8. T. *Bojeri*, Hook. et Grev.; caudex creeping more or less tomentose, fronds small erect simple flabelliform membranaceous lobed, the margins quite glabrous, lobes rounded subcrenate soriferous, veins flabellate dichotomous rather distant, involucres subcylindrical attenuated at the base wholly

sunk in the frond, the mouth dilated concave scarcely 2-lipped, receptacles much exserted, stipes elongated.—*Hook. et Grev. Ic. Fil. t.* 155. T. undulatum, *Wall. Cat. n.* 160.

Hab. Mauritius, *Bojer*, *Wallich*, *Néraud.* — At first sight this might almost be mistaken for large specimens of *T. reptans;* but the frond is more flabelliform, tapering into a longer stipes, the involucres are quite sunk or immersed in the fronds and the receptacles are exserted.

†† *Fronds with a central costa or rib, pinnated with simple or dichotomous oblique veins.* (*Sp.* 9—12).

9. T. *muscoides*, Sw.; caudex creeping tomentose, fronds small erect simple everywhere glabrous oblong or oblongo-lanceolate obtuse cuneate and nearly sessile sinuato-pinnatifid with an intramarginal vein, reticulations in parallel lines minute, involucres cuneate wholly sunk, the mouth spreading scarcely 2-lipped, receptacles slightly exserted.—*Sw. Fl. Ind. Occ. p.* 1726. *Syn. Fil. p.* 141. *Willd. Sp. Pl.* v. *p.* 500. *Hook. et Grev. Ic. Fil. t.* 179, (*excl. syn.* T. hymenodes, *Hedw.*)

Hab. West Indies. Jamaica and Hispaniola, *Swartz*, *Wiles and Higson.* Dominica, *C. S. Parker.* St. Vincent, *L. Guilding.* Java, *Zollinger*, in Herb. Heward. — An elegant and very delicate species, 2—3 inches high. The venation is not flabellate, but approaching to it; there is a central vein or costa whence the lateral veins diverge at very oblique angles, and are rather close, simple or dichotomous. The species is well marked, especially by the intramarginal vein to which the lateral veins from the costa are united. Involucres wholly sunk; the mouth very wide, level with the margin.

10. T. *erosum*, *Willd.*; "caudex filiform creeping dilated at the apex laciniated and irregularly pinnatifid, principal veins forked secondary simple slender." *P. de Beauv. Fl. Oware et Benin*, ii. *p.* 79, *t.* 109, *f.* 3. *Willd. Sp. Pl. p.* 501.

Hab. Oware and Benin, Western Africa, *Beauvois.*—The figure is not a very satisfactory one, but resembles a narrow form of *T. muscoides.*

11. T. *pusillum*, Sw.; caudex creeping tomentose, fronds small erect crowded oblong or cuneate tapering into a short stipes subbipinnatifido-lobate costate with oblique dichotomous subpinnated veins, margins with stellated hairs, involucres cylindrical tapering 2-lipped half sunk in the apex of a lobe, columella slightly exserted.—*Hedw. Fil. cum Ic. Sw. Syn. Fil. p.* 142. *Willd. Sp. Pl.* v. *p.* 499. Didymoglossum pusillum, *Desv.*

Hab. Jamaica, *Swartz.* Trinidad, *Lockhart.* — Allied to *T. muscoides*, especially in the veining and reticulation; but it is smaller, narrower, with a more tapering base, and with involucres which are half exserted.

12. T. *apodum*, Hook. et Grev.; caudex creeping very tomentose, fronds minute sessile cordato-rotundate deeply and

broadly lobed, the lobes obtuse sinuate with stellated hairs in the sinuses, reticulations irregular, veins pinnated remote subdichotomous, involucres rare solitary terminal quite exserted, subcylindrical attenuated below 2-lipped at the mouth, receptacles three or four times as long as the involucres.—*Hook. et Grev. Ic. Fil. t.* 117.

Hab. Barbadoes, *C. S. Parker, Esq.*—A very distinct species, though at first sight resembling *T. punctatum*; but different in texture, the reticulation being of the ordinary kind, and the venation not flabellate as in the species just mentioned.

††† *Fronds with only a solitary central vein or costa in each segment.* (*Sp.* 13—19).

13. T. *parvulum*, Poir.; caudex creeping densely matted tomentose, fronds reniform or rotundato-cuneate stipitate inciso-palmate glabrous, segments linear obtuse emarginate or bifid, involucres terminal sunk subturbinate, the mouth spreading obscurely 2-lipped, receptacles slightly exserted. (Tab. XXXIX. A.) — *Poir. Encycl. Bot.* viii. *p.* 44. *Blume, En. Fil. Jav. p.* 223. T. sibthorpioides, *Bory, in Willd. Sp. Pl.* v. *p.* 498.

Hab. Bourbon, *Bory, Poiret.* Java, *Blume.* Philippine Islands, *Cuming, n.* 256. Moluccas, *Gaudichaud.* New Ireland, *Barclay.* Madagascar, *Du Petit Thouars.*—An elegant little species, resembling some palmated *Jungermannia*, especially our *J. flabellata*, with a comparatively short stipes, but little longer than the frond.

14. T. *proliferum*, Bl.; caudex creeping downy much entangled, stipes elongated bearing fronds which are proliferous from their axils and which are subreniform or cordate deeply divided palmate or almost digitate, the segments linear and often again divided obtuse, involucres subcylindrical quite sunk, the mouth spreading obscurely 2-lipped. (Tab. XXXIX. B.) *Bl. En. Fil. Jav. p.* 224.

Hab. Trunks of trees, Java, *Blume.* Luzon, *Cuming, n.* 209. — A very remarkable plant, for the stipes is branched or proliferous; that is, from the base or axis of the frond, or sometimes from below the base, the stipes is extended and again bears one or more fronds. It is allied in the fronds themselves to *T. parvulum*, but larger, more deeply divided, so as to be often almost digitate.

15. T. *minutum*, Bl.; "frond (subbinate or ternate) on a long stipes, leaves petiolate nearly round cuneate at the base inciso-palmate glabrous, segments linear obtuse bifid." *Bl. En. Fil. Jav. p.* 223.

Hab. Mossy trunks of trees in mountains, Java, *Blume.*—Blume observes that this differs from *T. parvulum* in the longer stipes of the frond, in the latter being more cuneate at the base, the segments generally bifid or bipartite;" but from his term, "frond subbinate or ternate," which expres-

sion the same author employs in his character of *T. proliferum*, it is perhaps very nearly allied to that species: and indeed under that (*T. proliferum*) he remarks "a præcedentibus (*T. parvulum* et *T. minutum*) differt laciniis pinnatifidis."

16. T. *bifolium*, Bl.; "frond on a long stipes binato-conjugate rhombeo-ovate tripartite glabrous, segments cuneate truncate subtrifid erose at the apex." *Bl. En. Fil. Jav. p.* 224.

Hab. Mossy trunks of trees, mountains of Java, *Blume.* — "An potius var. *T. proliferi*, nob.?"

17. T. *digitatum*, Sw.; caudex creeping hairy, fronds stipitate linear digitate dichotomous, the segments linear elongated the margins setose, involucres cuneato-cupshaped compressed shortly 2-lipped quite sunk, receptacle elongated.— *Sw. Syn. Fil. p.* 370 *and* 422. T. lanceum, *Bory in Willd. Sp. Pl.* v. *p.* 501. *Sieb. Syn. Fil. n.* 81. *Hook. et Grev. Ic. Fil. t.* 33.

Hab. Mauritius and Bourbon, *Bory*, *Sieber*, *Telfair*. Java, *Blume.* — Blume observes that the specimens of Java differ from the Mauritius ones in the broader fronds with more numerous segments, which are again more frequently bifid. Our specimens have the fronds with 2—4 segments, of a dark lurid green color when dry.

Dubious Species of the section "entire, lobed or digitate fronds."

18. T. *flabellatum*, Bory; "frond cuneato-flabellate, segments dichotomously furcate." *Bory in Duperrey, Voy. Bot. p.* 281. T. Flabellula, *D'Urv. Fl. Isles Malouines in Mém. Soc. Linn.*, iv. *p.* 597.

Hab. Falkland Islands, *D'Urville*, *Gaudichaud.* — M. Bory de St. Vincent observes that "M. Gaudichaud detected this in the Falkland Islands as well as M. D'Urville, but that he confounded it with his *Hymenophyllum cæspitosum*. We have not seen the fructification, but its resemblance to *T. sibthorpioides*, nob. in Willd., induces us to refer the plant of M. d'Urville to this genus. Its stipes is filiform, simple, 5—6 lines high, expanding into a small flabellate frond, wedge-shaped below, divided into two small segments, which again are thrice forked, spreading, the apices acute. It is principally this latter character which distinguishes *T. flabellata* from *T. sibthorpioides*. It grows in dense tufts and becomes black in drying." *Bory*. D'Urville himself says of it, "extremitates subradicantes. *T. sibthorpioidi* vicinum."

19. T. *cuspidatum*, Willd.; "fronds ovate acuminate obtuse stipitate, base sinuato-subtruncate coarsely crenate and undulate." *Willd. Sp. Pl.* v. *p.* 499.

Hab. Bourbon, *Flügge.*—"Stipes 4 lines long, compressed, clothed with small paleaceous setæ. Frond an inch long or less, ovate or oblong, cuneate or truncate at the base, attenuated and obtuse at the apex, the margin deeply and obtusely crenate, undulated, membranaceous, nervoso-veined, soriferous towards the apex and at the margin."

** *Fronds pinnatifid, in* T. Kaulfussii *and* T. brachypus *almost bipinnatifid.* (*Sp.* 20—28).

20. T. *intramarginale,* Hook. et Grev.; caudex creeping somewhat tomentose, fronds small erect pinnatifid tapering into a short stipes, the segments few linear-oblong obtuse erecto-patent slightly waved opaque with a slender intramarginal vein, the apices retuse, involucres subcylindrical tapering at the base sunk entirely in the apex of the segments, the mouth spreading of 2 short lips, receptacles included (?). — *Hook. et Grev. Ic. Fil. t.* 211.

Hab. Ceylon, (*Dr. Lindley*).—A small plant, 1—1½ inch high. I have received this, and but few specimens, only from Dr. Lindley, gathered probably by Macrae. The receptacles appear to be included, but they are perhaps broken away.

21. T. *Krausii,* Hook. et Grev.; caudex creeping very tomentose, fronds small oblong sessile or stipitate obtuse at the base or cuneate and attenuated deeply pinnatifid almost to the rachis, the segments linear-oblong obtuse sinuate or sometimes again pinnatifid stellato-pilose in the sinuses, involucres subcylindrical attenuated at the base much sunk in the frond 2-lipped, the lips large semiorbicular exserted generally margined with red. — *Hook. et Grev. Ic. Fil. t.* 149.

Hab. Dominica, *Dr. Kraus.* St. Vincent, *L. Guilding.* Trinidad, *Lockhart.* Guiana, *Leprieur.* Berbice, *Schomburgk.* Porto Rico, *Bertero.* Guadeloupe, (*Herb. Delessert et Heward*). Jamaica, *Purdie.*— An elegant species. Fronds 1—3 inches high: the larger specimens have sometimes the segments again slightly and irregularly pinnatifid.

22. T. *quercifolium,* Hook. et Grev.; caudex creeping tomentose, fronds small obovate or oblong-cuneate tapering into a very short downy stipes deeply pinnatifid, the segments spreading oblong obtuse sinuated stellato-hirsute in the sinuses soriferous at the apex, involucres wholly exserted subcylindrical attenuated at the base 2-lipped, lips large semiorbicular margined with purple. —*Hook. et Grev. Ic. Fil. t.* 115. T. montanum, *Hook. Ic. Pl. t.* 187.

Hab. Woods, Esmeraldas, El Equador, at an elevation of 8500 feet above the level of the sea, *Jameson.*—Distinguished from *T. Krausii* by the less divided segments and wholly exserted involucres, still larger lips and protruded receptacles.

23. T. *sinuosum,* Rich.; caudex creeping, fronds lanceolate pinnatifid in a greater or less degree tapering into a stipes, the segments ovate or oblong obtuse sinuato-lobate scarcely again pinnatifid hairy at the margin and frequently on the veins beneath, involucres entirely sunk in the lateral teeth or lobes of the segments urceolate, the mouth spreading obscure-

ly 2-lipped, receptacles filiform much exserted. — *Rich. in Willd. Sp. Pl.* v. *p.* 502. *Lam. Illustr. t.* 871, *f.* 1. *Hook. et Grev. Ic. Fil. t.* 13. T. quercifolium, *Desv. in Berl. Mag.* v. *p.* 328, (*not Hook. et Grev.*) *Bory in Dict. Sc. Nat. cum Ic.*

Hab. Guadeloupe and other West Indian Islands, frequent. Peru, *Poeppig.*—From 4—9 inches high, very thin, membranaceous and pellucid.

24. T. *incisum*, Kaulf.; caudex creeping, fronds lanceolate acuminate deeply pinnatifid hairy at the margin and especially on the veins beneath, tapering into a short stipes, involucres in the lobes of the segments urceolate entirely sunk, the mouth spreading obscurely 2-lipped, receptacles filiform much exserted.—*Kaulf. En. Fil. p.* 261. *Bory in Duperrey's Voy. Bot. p.* 282, *t.* 38, *f.* 1. T. sinuosi *planta junior, Knze.*

Hab. St. Catherine, Brazil, *Macrae, Beechey, Tweedie.* S. Brazil, *Chamisso.* Rio, *Douglas;* at San Gaetano, *Gardner, n.* 5326.—Kaulfuss first described this species, and was at some pains to distinguish it from *T. sinuosum*, to which, it must be confessed, it is too nearly allied. It differs in the more delicate texture, more hairy fronds, which are more attenuated at the apex, with longer, deeper, and more divided segments, always more or less glaucous: and the characters now mentioned are constant in my specimens from several localities.

25. T. *Ankersii*, Parker in Hook. et Grev. Ic. Fil.; caudex exceedingly long creeping more or less tomentose, fronds numerous distant nearly sessile broadly lanceolate subacuminate obtuse at the base deeply pinnatifid, the segments oblong obtuse angulato-dentate the lowermost sometimes auricled at the base or subpinnatifid, involucres subcylindrical pedicellate from the apex of a tooth and solitary at the superior base of each segment or numerous along the margins. — *Hook. et Grev. Ic. Fil. t.* 201.

Hab. Trunks of trees, British Guiana, *C. S. Parker.*—Allied in habit to *T. brachypus*, but very distinct, with the segments undivided. Caudex creeping apparently to a very great length, 2 feet and probably much more, simple or branched. Fronds numerous but distant, 3—4 inches to a span long, membranaceous yet tolerably firm, turning nearly black in drying. Veins pinnated, simple. Receptacles long, much exserted.

26. T. *brachypus*, Kze.; caudex much elongated creeping, fronds numerous nearly sessile flaccid procumbent, ovato-oblong bipinnatifid, the segments all patent, primary divisions oblong, secondary bi-trifid, segments rather acute costa rooting, involucres terminal on the ultimate segments cylindrical attenuated at the base completely exserted and pedicellate, the mouth short spreading scarcely 2-lipped, the receptacles filiform much exserted.—*Kze. Pl. Crypt. Poepp. p.* 105. T. radicans, *Hook. et Grev. t.* 218 (*excl. syn.*), *not Swartz. Moricand in Herb. Bras.*

Hab. Trinidad, *Lockhart*. St. Vincent, *L. Guilding*. Berbice, *Schomburgk*. Brazil, *Moricand*. Peru, *Poeppig*.—Kunze is no doubt quite correct in considering this distinct from *T. radicans*, Sw. (a species long ill understood, by others as well as by us), which is a much more compound species, as will be found on comparison. Its nearest affinity is with *T. Ankersii*, but it differs in the more divided segments of the frond, so divided, indeed, as rather to belong to the section with bipinnatifid fronds; the fructifications, too, are more copious. It is on account of its close affinity with *T. Ankersii* that I have referred the plant to this group.

27. T. *Kaulfussii*, Hook. et Grev.; caudex short stout creeping, fronds approximate subcæspitose stipitate rather tall hairy with stellated hairs broadly almost ovato-lanceolate pinnatifid having a broad wing to the rachis, the segments approximate horizontal lanceolate rather rigid lobato-dentate subpinnatifid, lobes short generally obtuse, involucres copious cylindrical cup-shaped sunk entirely in the segment the mouth a little spreading not lipped, stipes winged above, receptacles filiform much exserted. — *Hook. et Grev. Ic. Fil. App. p.* 9. T. lucens, *Hook. et Grev. Ic. Fil. t.* 10, (*excl. syn.*)

Hab. Jamaica, *Menzies, &c.* St. Vincent, *L. Guilding*. British Guiana, *C. S. Parker*. Dominica, *Dr. Imray*. St. Thomas, *Dr. Torrey*. — Frond from a span to a foot and a half high, erect, rigid, dark-colored and somewhat crisped when dry: the segments approximate, patent, nearly horizontal, having a broad wing next the rachis (owing to the sinuses terminating at a regular distance from the rachis). The real *T. lucens*, although this was mistaken for it in the 'Icones Filicum,' is a very different species.

Dubious Species of this Section.

28. T. *trigonum*, Desv.; "frond lanceolate pinnatifid hairy beneath, segments lanceolate acute dentato-serrate, stipes trigonal." — *Desv. Mag. Nat. Berl.* 1811, *et in Mém. Linn. Soc. t.* 9, *f.* 2. *Spr. Syst. Veg.* iv. *p.* 128.

Hab. Guiana, (*Desvaux*). — With this I am unacquainted. Kunze, in 'Linnæa,' ix. p. 105, says of this, it is distinguished from *T. plumosum*, Kze., described as a pinnated species, by the frond being pinnatifid, the segments acute and the stipes margined above.

**** Fronds throughout pinnatifidly divided, decompound; i. e., twice or more pinnatifid.* (T. Bancroftii *is often only pinnatifid*). (*Sp.* 29—42).

(*Fronds erect, tufted. Caudex creeping but short, or none. Sp.* 29—31).

29. T. *attenuatum*, Hook.; fronds tufted rather small stipitate hairy with copious long branched fulvous hairs ovato-lanceolate acuminate pinnatifid almost to the rachis which has rather a narrow wing, the segments subremote spreading lanceolate or linear-lanceolate attenuate pinnatifid (more or less deeply) their membranaceous flaccid glossy ultimate segments acute sometimes sinuated, involucres cuneate cup-shaped completely sunk in a segment of the frond, the mouth

with two wide spreading lips, stipes distinctly densely rufo-pilose winged above, receptacles much exserted. (TAB. XXXIX. C.)

Hab. St. Vincent, *L. Guilding.* Jamaica, *MacFadyen.* Dominica, *Imray.* — A delicate, very distinct species, 4 inches to a span high; intermediate in general structure between *T. Kaulfussii* and *T. alatum*, more deeply bipinnatifid than the former, less so than the latter, with very different involucres and smaller than either.

30. T. *alatum*, Sw.; tufted tall stipitate slightly hairy with branched tawny hairs, fronds broadly lanceolate acuminate deeply pinnatifid almost to the rachis which has only a narrow wing, segments rather distant spreading linear-lanceolate acuminate deeply pinnatifid thin membranaceous flaccid slightly glossy the ultimate segments lanceolate bifid or dentato-pinnatifid, involucres cuneate quite sunk in the segments, the mouth spreading scarcely 2-lipped, stipes slightly winged above more or less hairy, receptacles much exserted. — *Sw. Fl. Ind. Occ.* iii. *p.* 1732. *Syn. Fil. p.* 143. *Willd. Sp. Pl.* v. *p.* 506, (*not Hook. in Fl. Lond.*) *Hook. et Grev. Ic. Fil. t.* 21. *Plum. Fil. t.* 50, *f.* D.

Hab. Hispaniola, *Plumier.* Mountains, Jamaica, *Swartz.* St. Vincent, *L. Guilding.* Trinidad, *Lockhart;* and probably in the West Islands generally.—Readily distinguished from *T. attenuatum*, by its taller fronds, 8—10 inches long, exclusive of the stipes, darker color, more divided, so that the lower part is sometimes tripinnatifid. The figure in the 'Icones Filicum' is very characteristic.

31. T. *Bancroftii*, Hook. et Grev.; caudex short creeping, fronds somewhat tufted rather small ovate sometimes subdeltoid deeply pinnatifid nearly glabrous rigid, the rachis with a broad wing, the segments oblong approximate entire or nearly so, sometimes sinuato-pinnatifid and sometimes deeply pinnatifid, the ultimate segments linear oblong obtuse, involucres entirely sunk in the apices of the ultimate segments cuneato-cylindrical, the mouth spreading but not 2-lipped, stipes with a very broad wing extending almost to the base, receptacles much exserted filiform.—*Hook. et Grev. Ic. Fil. t.* 204. T. coriaceum, *Kze. En. Pl. Crypt. Poepp. p.* 105.

Hab. Jamaica, *Bancroft, Purdie.* St. Vincent, *L. Guilding.* British Guiana, *Parker, Schomburgk.* Surinam, *Hostmann, n.* 26, *Wiegelt.* Peru, and Brazil, *Poeppig.*—Very distinct and well marked. Kunze's *T. coriaceum* is by no means different from our plant, which varies in being only pinnatifid or bi-tripinnatifid, always with a very broad wing to the rachis, extending far down towards the base upon the stipes. Varies in size from 1—6 inches.

(*Fronds remote, from an elongated creeping caudex. Species* 32—42).

32. T. *humile*, Forst.; caudex creeping matted, fronds

small lanceolate bipinnatifid glabrous margined, the segments linear obtuse entire, involucres axillary oblong cylindrical quite free but with a narrow wing on each side, and the mouth with 2 short rounded lips, rachis winged above.—*Forst. Prod. n.* 464. *Hedw. Fil. cum Ic. Sw. Syn. Fil. p.* 143 *and* 371. *Willd. Sp. Pl.* v. *p.* 507. *Hook. et Grev. Ic. Fil. t.* 35. T. minutulum, *Gaud. in Freyc. Voy. p.* 377, *t.* 12, *f.* 2 ?—β. involucres strongly winged or sunk in the frond.

Hab. Society Islands, *Forster.* Otaheite, *Menzies*, *Mathews*, *n.* 29 (under the name of *T. floribundum*). Pacific Islands, *Beechey*, *Nightingale.* Luzon, *Cuming*, *n.* 98. — β. Waimate, Bay of Islands, New Zealand, *A. Cunningham*, 1838, *Dr. Sinclair, J. D. Hooker.* — A distinct species, 2—3 inches high, including the short stipes, with a distinctly thickened margin to the frond, and supraaxillary involucres, sometimes free or slightly winged, sometimes sunk in the frond.

33. T. *pyxidiferum*, L.; fronds rather small oblong-ovate bitripinnatifid sometimes scarcely winged below (and then pinnate) membranaceous pellucid not margined somewhat glossy, the segments linear glabrous entire often emarginate at the apices, involucres solitary axillary wholly sunk subcylindrical attenuated at the base opening above into a broad concave scarcely 2-lipped mouth, receptacles very long filiform much exserted, stipes winged or margined above rarely naked. — *Linn. Sp. Pl. p.* 1561. *Sw. Fl. Ind. Occ. p.* 1739. *Syn. Fil. p.* 143. *Willd. Sp. Pl.* v. *p.* 508. *Hedw. Fil. cum Ic. Hook. et Grev. Ic. Fil. t.* 206. T. pedicellatum, *Desv.* (*according to Sprengel*). T. lacerum, "*Desv. Journ. Bot.* iii. *t.* 10." T. Brasiliense, *Desv. in Mém. Soc. Linn.* ii. *p.* 328, *t.* 7, *f.* 4. *Plum. Fil. t.* 50, *E.*— β. more divided, the numerous segments crowded. — γ. fronds equally divided with β., the segments broader.

Hab. West Indian Islands, as it would appear, frequent, *Swartz*, *&c.* Brazil, *Raddi and others.* β. Organ mountains, Brazil, *Gardner*, *n.* 206. Maynas, Peru, *Poeppig.* γ. Casapi, Peru, *Mathews.* — A variable plant; but the usual form is correctly represented in the 'Icones Filicum' above quoted.

34. T. *Filicula*, Bory; caudex creeping clothed with dense black down, fronds rather small opaque ovato-lanceolate bipinnatifid, the segments linear rather acute entire compactly cellular, involucres solitary supraaxillary cylindrical tapering at the base wholly sunk or winged at the sides the mouth with 2 large narrow ovate or subtriangular acute lips nearly as long as the tube, stipes broad compressed winged above. — *Bory in Duperrey's Voy. Bot.* i. *p.* 283. T. bilabiatum, *Nees in Nov. Act. Cur.* 1823, *t.* 13, *f.* 2, (*excluding the synonyms*). T. bilingue, *Menz. in Herb. Hook. J. Sm. in En. Fil. Philipp.* (*name only*). T. bipunctatum, *Poir.* T. melanotrichum,

Schlecht. Fil. Cap. in Linnæa, x. *p.* 553. Hymenophyllum Filicula, *Bory in Willd. Sp. Pl.* v. 528. H. alatum, *Schkh. Fil. p.* 133, *t.* 135, *b.* (*excl. the syn. of Smith and Swartz*), *excellent.* Didymoglossum decipiens, *Desv. in Mém. Soc. Linn. Par.* ii. *p.* 330, *t.* 7, *f.* 3, *excl. syn*). D. Filicula, *Desv. l. c. p.* 331.

Hab. Mauritius and Bourbon, *Bory*, *Telfair*, *Bojer*. Ceylon, *Mrs. Genl. Walker*, *Macrae*. Bonin, (*Herb. Imp. Acad. Petrop.*) Nepal, *Wallich.* Nilgherries, *Sir Fred. Adams.* E. Indies, *Herb. Wight. propr. n.* 3478 *and* 150. Luzon, *Cuming*, *n.* 2. Coral Islands, *Beechey.* Otaheite, *Bennett.* S. Africa, *Drège.* — Apparently a general inhabitant of the East Indies; strangely confounded with our Irish *T. radicans* (*Hymenophyllum alatum*, Sm.) by Schkuhr, and little understood by botanists in general. Frond 2—4 or 5 inches high, more or less dense in its ramifications or divisions, always very opaque, when dry of a dingy brownish or olive green, the lips of the sunk involucres singularly large and tapering to a rather acute point.

35. T. *radicans*, Sw.; caudex very long more or less tomentose, fronds ovate or oblong acuminate erect rather firm membranaceous bi-tri-quadripinnatifid dark green and opaque (when dry) primary divisions ovate or lanceolate cuneate at the base, the segments linear-oblong rather short obtuse emarginate or bifid, involucres supraaxillary cylindrical tapering below sunk in the more or less narrow short segments and hence more or less winged at the sides, the mouth scarcely spreading imperfectly or shortly 2-lipped sometimes wider than the tube, receptacles (when perfect) filiform many times longer than the tube, stipes short or long tereti-compressed winged nearly to the base sometimes broadly so. — *Sw. Fl. Ind. Occ. p.* 1736. *Syn. Fil. p.* 143. *Willd. Sp. Pl.* v. *p.* 513. *Klotzsch in Herb. Reg. Berol. et in Herb. Hook.* (*not Hook. et Grev. Ic. Fil. t.* 218). T. scandens, *Hedw. Fil. cum Ic.* (*tolerably good*), *excl. most of the syn. Raddi, Fil. Bras. p.* 65, (*excl. most of the syn. Martens et Galeotti, Fil. Mex. p.* 80. T. diaphanum, *H. B. K. Nov. Gen. Am.* i. *p.* 25. T. ambiguum, *Sieb. Syn. Fil. n.* 143. T. anceps, *Wall. Cat. n.* 166, (*not Hook.*) T. umbrosum, *Wall. Cat. n.* 165. T. speciosum, *Willd. Sp. Pl.* v. *p.* 514. T. pyxidiferum, *Huds. Fl. Angl. p.* 461, (*not Linn.*) T. brevisetum, *Br. in Hort. Kew. ed.* 2, v. *p.* 529. T. alatum, *Hook. in Fl. Lond. n. ser.* iv. *t.* 53, (*not Sw.*) T. Europæum, *Sm. in Rees' Cycl.* T. Hibernicum, *Spr.* Hymenophyllum rupestre, *Raddi, Fil. Bras. p.* 67, *t.* 80, (81 *in text*). H. alatum, *Sm. in E. Bot. t.* 1417, (*not Schkuhr, Fil. t.* 135, *b.*) *Willd. Sp. Pl.* v. *p.* 526. H. Tunbridgense, *β. Sm. Fl. Brit. p.* 1142. Didymoglossum alatum, *Desv.* — Filix humilis repens, &c. *Dill. in Raii Syn. p.* 127, *t. f.* 3 (*barren, very good*) *and f.* 4.

Hab. Jamaica, *Swartz*, *Bancroft*, *Purdie and others*; (true form, fronds

ovate or ovato-lanceolate 3—4-pinnatifid, compact, 6—10 inches long, segments rather short; stipes, even from the same caudex, varying from 1—5 inches long and more or less winged). Woods above Port Stewart, *Purdie;* (fronds barren, and perhaps a distinct species, broadly ovate, more deeply divided and spreading segments which are longer, narrower and linear; stipes 1½ to 3 inches). Martinique, *Sieber;* (usual form). Brazil, *Raddi, Forbes, Macrae, Gardner, n.* 203, *Scouler, Sinclair, Vautier, n.* 165; fronds sessile or nearly so, more elongated, 6—18 inches, primary divisions more distant, segments generally longer and narrower, less spreading, involucres sometimes more spreading at the mouth and rather more distinctly 2-lipped). —Mexico; Vera Cruz, *Linden;* (common form, fronds sessile and stipitate). Xalapa, *Galeotti,* (elongated, fronds on short stipes, mouth of the involucre scarcely spreading, not 2-lipped, otherwise resembling the Brazilian form). Tabasco, *Linden;* (fronds scarcely tripinnatifid, 1½ foot long, very black, primary divisions remote, especially the lower ones, and extending almost to the base, involucres with 2 rounded distinct lips, broader than the tube of the involucre: perhaps a distinct species?) — Forest of Esmeraldas, El Equador, *Col. Hall;* (fronds sessile resembling those from Brazil, but involucres distinctly 2-lipped, as the preceding). — Sandwich Islands, Owhyhee, *Menzies;* Oahu, *Macrae, Douglas, Diell;* (fronds more or less elongated, of the normal form, sessile and stipitate, stipes sometimes 3—4 inches long, involucres with and without lips).—Nepal, in the mountains, *Wallich;* (fronds lanceolate and oblong-lanceolate, 4 inches to a foot long; in other respects resembling the usual structure; involucres scarcely dilated upwards, without lips or very obscurely 2-lipped).—Europe; Teneriffe, *Broussonet;* Madeira, *Lowe and others.* Azores, 2—3000 feet of elevation, *Dr. Hochstetter, H. C. Watson.* England, very rare, at the head of a remarkable spring, Belbank, 12 miles from Bingley, Yorkshire, *Dr. Richardson,** according to Dillenius, in Ray's 'Synopsis,' perhaps extinct. Powerscourt, *Miss Felton, Dr. Wm. Stokes;* County of Wicklow, *J. Nuttall, Esq.;* and it has, I believe, been found recently in various localities in the south of Ireland by *Mr. Babington* and *Mr. Winterbottom;* (this form is ovate, compact, almost exactly resembling the normal state, but the stipes is more elongated, sometimes 1 inch, generally 3—4 inches long, receptacles usually short or broken; involucres without lips and not spreading at the mouth, or with short moderately spreading ones).—Iveragh, Ireland, Sept. 1842, *Wm. Andrews, Esq.;* (fronds narrower and more elongated, 6—8 or 10 inches long, in other respects resembling the normal form; fructifications very copious, receptacles generally very much elongated; stipes 3—4 inches long). — I regret to have been under the necessity of occupying so much space in my attempts to unravel the difficulties which have always attended the correct synonymy of one of our own most beautiful and rarest native Ferns, and respecting which Sir J. E. Smith said, nearly thirty years ago, that "few plants of almost any country have caused more enquiry, or more diversity of opinion than this Fern." Yet even Sir Jas. Smith did not suspect that it was a plant already, though imperfectly, described, of South America, and even of Teneriffe and Madeira; nor has any one ventured to publish it as the same to the present day, though I believe the probability of identity has been suspected by several of our friends; yet by no one so much urged as by Mr. Andrews, who, from his having the good fortune to discover a new habitat for a rather striking variety above mentioned,

* A specimen from him, but a very imperfect one, is in the Banksian herbarium, now in the British Museum.

investigated, as far as lay in his power, and more closely than any one else, the subject of its affinity with some exotic species, and clearly insisted upon it, in his letters to me, at a time when I was disposed to entertain a different opinion. My own fern-herbarium affords so ample a suite of specimens from various localities, both in the old and the new world, that I feel a degree of confidence in the correctness of my views, and in the opinion that the above mentioned kinds may be considered forms of one and the same species. Two of them, namely the var. from Jamaica, (*Purdie*) and that from Tabasco, Mexico (*Linden*) may possibly prove distinct, but the former is quite barren, and the latter might, I think, without violence to nature, be considered a strongly marked variety. Of the identity of the ordinary West Indian form, and the first described, as well as that of Nepal, and the specimens from the Azores, Canaries, and Madeira, there can be no reasonable doubt: — and even with regard to the sessile kind so common in Brazil, and of which a sterile frond is well represented by Raddi, (Fil. Bras. t. 80); the same is found in the Sandwich Islands, mixed with the usual form, and having a greater or lesser length of stipes. The more or less distinct lips to the involucres is also a variable character, even in our British specimens, and remarkably so in the Sandwich Island ones. Mr. Andrews observes that in his elongated variety from Iveragh, the receptacles do not lie flat on the segments as do those of Killarney, but turn up from the back of the fronds very conspicuously, and are generally much curved. This may be owing to their great length, and the greater or less exposure to the light. Mr. E. Newman, who has devoted such zealous attention to the Ferns of this country, remarked scattered "moniliform or jointed scales" (or hairs) on the Irish *Trichomanes*, not noticed by botanists, and of which he has prepared a wood-cut for the forthcoming new edition of his 'British Ferns.' They exist in a greater or less degree on the specimens from other countries; and indeed in other species of the genus also.

36. T. *Kunzeanum*, Hook.; caudex long creeping, fronds ample tall 3-4-pinnatifid rather rigid very opaque almost black when dry, primary and secondary segments remote arising from slightly winged rachises (almost pinnate with the rachis margined or winged), lowermost superior secondary ones appressed to the main rachis, ultimate segments rather short linear and undivided or somewhat cuneate and bifid, involucres axillary or supraaxillary cylindrical slightly tapering at the base quite free not winged scarcely spreading at the mouth without distinct lips, receptacles much exserted, stipes very long semiterete scarcely winged glabrous. (Tab. XXXIX. D.) — T. radicans, *Kze. in Pl. Crypt. Poepp. p.* 106, (*excl. syn.*) —Adiantum scandens, &c., *Plum. Fil. t.* 93 ?

Hab. Peru, on trees, Pangoa, *Mathews, n.* 1088; Papayaco, *Poeppig* (*in Herb. nostr.*) Caraccas, *Linden, n.* 176.—Very distinct, but perhaps most nearly allied to the preceding, on which account I place it in this section; for the margined, or only slightly winged rachis, would rather have induced me to refer it to the division with the "fronds pinnated, pinnæ decompoundly pinnatifid." It does not appear to be noticed by any author except Kunze, who has referred it to *T. radicans*, Sw., the *T. scandens*, Hedw., from which it is in many respects totally different. The stipes is a span

long. Frond 1 foot to 1½ foot, ovate in circumscription, rather rigid, everywhere quite black in the dry state and opaque, exhibiting very minute semitransparent dots when held between the eye and the light and seen through a magnifier; which dots are the areolæ of the reticulations. Divisions remote, superior secondary ones at the base of the primary ones lying against the rachis. Involucres quite free, not even winged. Plumier's plant may perhaps be intended for the same species; but however excellent that author's work is, for the period at which it was published, many of his species cannot be determined by his figures. I have not seen the present fern from any of the West Indian Islands; only from three localities on the continent of S. America.

37. T. *glauco-fuscum*, Hook.; fronds rather tall oblongo-lanceolate bipinnatifid glauco-fuscous when dry, primary divisions broad-lanceolate, the segments all acute linear simple or forked, involucres supraaxillary on short segments partially sunk short-cylindrical attenuated at the base, the mouth broad spreading scarcely 2-lipped, stipes filiform glabrous indistinctly winged except above. (Tab. XL. A.) *Hook. in Nightingale's Oceanic Sketches, App. p.* 131.

Hab. Pacific Islands, *Sir Thos. Nightingale.* Penang, *Lady Dalhousie.* Ceylon, *Mrs. Genl. Walker.* Philippine Islands, *Cuming, n.* 219.—A well marked species. Stipes slender, filiform, only slightly winged above, 2—4 or 5 inches long. Frond 5—6 or 8 inches; in a dried state at least always of a brownish colour suffused with a glaucous tint, especially on the under side.

Dubious Species of the Section decompoundly pinnatifid.

38. T. *Guineense*, Sw.; "fronds pinnate, pinnæ oblong decurrent inciso-pinnatifid, segments obtuse subserrate (?), costa and stipes margined." *Sw. Syn. Fil. p.* 142. *Willd. Sp. Pl.* v. *p.* 506.—Sierra Leone, *Afzelius.*

39. T. *Arbuscula*, Desv.; "fronds deeply bipinnatifid glabrous subimbricated subpinnatifid broader at the apex, ultimate segments oblong obtuse, sori aggregate, receptacles elongated, stipes winged." *Desv. in Mém. Linn. Soc. Par.* ii. *p.* 236.—Guiana, (*Desvaux*). "Two inches high."

40. T. *striatum*, Don; "frond bipinnate, pinnæ alternate, leaflets elliptical membranaceous pellucid pinnatifid, lobes linear obtuse, rachis winged, involucres tubulose." *Don, Prodr. Fl. Nep. p.* 11.—Nepal, *Hamilton.*—"Fronds a span to a foot high; fructiferous ones more opaque and cut into narrower segments."

41. T. *thujoides*, Desv.; "fronds decurrently tripinnatifid, pinnæ alternate, pinnules decurrent deeply pinnatifid, segments spreading at the apex subtrilobulate, rachis winged, stipes somewhat angled crinite at the base." *Desv. in Mém. Linn. Soc. Par. p.* 328.—Mauritius, (*Desvaux*).—"Fronds 8—10 inches; stipes 8 inches; pinnæ 1½ inch long."

42. T. *album*, Bl.; "frond bipinnatifid ovato-oblong strigose whitish, pinnæ opposite or alternate cuneato-lanceolate pinnatifid, segments cuneiform incised ultimate ones linear subbifid, rachis margined, stipes terete glabrous." *Bl. En. Fil. Jav. p.* 226. — Lofty mountains of Java, *Blume.*

**** *Fronds simply pinnated* (*Sp.* 43—55).

Fronds tufted. Caudex short creeping or none, (*in* T. crispum *the caudex is sometimes long creeping and the fronds remote*). (*Sp.* 43—51).

43. T. *floribundum*, H. B. K.; fronds tufted erect tall simple (rarely) or pinnated, pinnæ lanceolate spinuloso-serrate upper ones decurrent, involucres urceolato-cylindrical copious marginal upon the pinnæ wholly exserted, the mouth entire slightly spreading, rachis sometimes prolonged at the apex rooting and as well as the costa slightly hairy, stipes long naked.—*H. B. K. in Willd. Sp. Pl.* v. *p.* 505. *Nov. Gen. Am.* i. *p.* 25. *Hook. et Grev. Ic. Fil. t.* 9. T. pinnatum, *Sw. Syn. Fil. p.* 142. *Hedw. Fil. cum Ic.* T. rhizophyllum, *Cav. Præl.* 1801, *n.* 696. *Sw. Syn. Fil. p.* 142. —β. *Vittaria;* frond linear-lanceolate very much elongated undivided. *Splitgerber, Fil. Surin. in Tydschr. Nat. en Physick.* vii. *p.* 440. T. Vittaria, *DeCand. Herb. Poiret, Encycl.* viii. *p.* 65. *Hook. in Lond. Journ. of Bot.* i. *p.* 137, *t.* 5.

Hab. Orinoco, *Humboldt and Bonpland.* Guiana (*Herb. Deless.*), *Schomburgk, C. S. Parker, Hostmann, n.* 63 *et* 75. Dominica, *Sieber.* Barbadoes, *Baron de Schach.* Jamaica, Trinidad, &c. Guatemala, *Skinner.* Peru *Poeppig.* Brazil, *Gardner, n.* 1909 and 4073. — β. Surinam, *Splitgerber, Hostmann, n.* 206. — One of the most splendid of this beautiful genus. Roots coarse, fibrous, descending. Caudex apparently none. Fronds 4 inches to 1½ foot high. Rachis sometimes running out far beyond the frond and proliferous, rooting. Pinnæ 2—6 inches long, from 4 to 20, terminal one often very much elongated, sometimes the lateral ones are wholly abortive or wanting, and then the plant becomes *T. Vittaria,* DeCand. and Hook., *l. c.*, which I now agree with Splitgerber in considering a remarkable state of *T. floribundum.* It is a foot and a half and more long, quite a simple frond, and, at first sight, very unlike the ordinary state of the plant. Veining close, forked; veins when seen under a lens united by slender transverse ones.

44. T. *pennatum*, Kaulf.; "sterile fronds oblong pinnate subsessile, pinnæ oblong obtuse denticulate subimbricate, fertile fronds rhomboid pinnated on a long stipes, pinnæ linear lowest ones obtuse the margins spinuloso-denticulate, upper pinnæ confluent, involucres exserted." *Kaulf. En. Fil. p.* 264.

Hab. *Cayenne,* (*Kaulfuss*).—I can see nothing in the author's characters and description to justify the separation of this from *T. floribundum*, and yet so accurate a man as Kaulfuss would hardly speak of it as "satis diversa," unless there were some really distinguishing marks.

45. T. *Javanicum*, Bl.; roots long coarse descending wiry fibres, fronds tufted lanceolate rigid (black when dry) pinnated, pinnæ subpetiolate oblong obliquely cuneate at the base obtuse at the apex inciso-subpinnatifid chiefly at the upper margin, involucres in the sinuses of the upper segments of the pinnæ generally solitary urceolate partially sunk, the mouth entire not 2-lipped, stipes and slightly marginal rachis setose.—*Blume, En. Fil. Jav. p.* 224. *Hook. et Grev. Ic. Fil. t.* 240. T. rigidum, *Wall. Cat. n.* 161 (not *Sw.*) T. setigerum, *Wall. Cat. n.* 158. T. rhomboideum, *J. Sm. En. Fil. Philipp.* (*name only*). T. curvatum, *J. Sm. l. c.* (*name only*). T. alatum, *Bory, in Duperrey, Voy. Bot. p.* 282, *t.* 38, *f.* 2, (not *Sw.*)

Hab. Shady places in Java, *Blume.* Choppadong, E. Indies, and at Singapore, *Dr. Wallich.* Penang, *Lady Dalhousie.* Malay Islands, *Barclay.* Philippine Islands, *Cuming, n.* 184 *and* 169. Oualan, *D'Urville.* — Few species are better marked or more easily recognized than the present. It is of a harsh and rigid texture, 8 or 10 inches to a foot high, including the stipes. Pinnæ an inch or more long, more or less incised, sometimes subauriculate near the upper base. Veins close, parallel, stout. Whole plant black in drying. — *T. fuscum*, Bl. (our next species) seems nearly allied to this, but the midrib of the pinnæ is described as paleaceo-hirsute on both sides, and the rachis and stipes as clothed with ferruginous hairs.

46. T. *fuscum*, Bl.; "frond pinnated lanceolate diaphanous, pinnæ alternate subsessile (upper ones adnate) oval obtuse truncated at the base lobato-pinnatifid paleaceo-hirsute on each side the costa, lobes incised, rachis margined above and as well as the nearly terete stipes ferrugineo-hirsute." *Bl. En. Fil. Jav. p.* 225.

Hab. Lofty mountains of Java, *Blume.*

47. T. *crispum*, L.; fronds generally tufted from a short stout creeping caudex but sometimes distant on a long creeping one erect somewhat pilose or clothed with long copious ferruginous hairs lanceolate pinnate, pinnæ horizontal oblong obtuse obscurely toothed upper ones coadunate, involucres several from the apices of the pinnæ urceolato-cylindrical spreading at the mouth with two diverging lips, stipes more or less hairy.—*Linn. Sp. Pl. p.* 1560. *Sw. Fl. Ind. Occ.* iii. *p.* 1731. *Syn. Fil. p.* 142. *Willd. Sp. Pl.* v. *p.* 504. *Hedw. Fil. cum Ic. Hook. et Grev. Ic. Fil. t.* 12. T. fastigiatum, *Sieb. Syn. Fil. n.* 144. T. cristatum, *Kaulf. (large var.) En. Fil. p.* 265. T. pilosum, *Raddi, Fil. Brasil, t.* 79 (80 *in text*), *f.* 1. *Mart. Crypt. Bras. t.* 68. T. longifolium, *Desv. (according to specimen). Plum. Fil. t.* 86. T. pellucens ? *Kze.*

Hab. West Indian Islands, probably general, as well as in tropical South America. Brazil, *Martius*, *Gardner*, *n.* 207, 208, *and* 1908. Peru, *Mathews*, *n.* 1788. Surinam, *Hostmann*, *n.* 505. — A well known and truly splendid species. Stipes 3—5 or 6 inches; fronds 4—12 or 14 inches long. Lips of the involucres much divaricated, and sunk, as well as the tube, in the substance of the frond. Receptacles sometimes very long, 4—5 times the length of the involucres; sometimes very short, probably broken?

48. T. *pellucens*, Kze.; "frond oblong linear acuminate deeply pinnatifid, the segments remote oblong linear obtuse irregularly sinuato-dentate pellucid at the costulæ and veins which are hairy beneath bearing sori at the apex, costæ and margined stipes clothed with hispid brown setæ." *Kze. in Pl. Crypt. Poepp. in Linnæa*, ix. p. 104.

Hab. Huallaga, Peru, *Poeppig*. "Belongs to the same group as *T. crispum*, L., *T. cristatum*, Kze. (*T. crispum*, Sw. and Hook. et Grev.), *T. pilosum*, Raddi, but most distinct." The same author further notices its similarity in texture to *T. pilosum*, but that, in other respects, is very different. It will however be observed, that those species are pinnated, whereas *T. pellucens* is described as pinnatifid. To judge from a very indifferent specimen of the "*T. pellucens*, Kunze," in my possession, distributed by Poeppig, this is in reality not distinct from *T. crispum*, and, like it, it is pinnated below, pinnatifid above.

49. T. *plumosum*, Kze.; "frond lanceolate linear acuminate pinnated, pinnæ subadnate oblong-linear attenuated and obtuse at the apex, the sterile margin unequally duplicato-dentate, hairy on each side on the costa and veins upper half soriferous, involucres sunk bidentate, stipes trigonal and as well as the rachis rufo-hirsute." *Kunze, Pl. Crypt. Poepp. p.* 104.

Hab. Pampayaco, Peru, *Poeppig*.—This surely is only another slight variety of *T. crispum*. Kunze remarks, "*T. crispum*, L., Sw., Hedw. Ic., pinnis latioribus et brevioribus, involucris *non* bidentatis paullo latius distat:" but in our specimens of true *T. crispum*, the involucres are bidentate, or, in other words, bilabiate.

50. T. *crinitum*, Sw.; fronds rather small tufted slightly glaucous pinnate, pinnæ ovate or oblong sinuate or pinnatifid, upper ones coadunate sometimes all of them are so (and then the frond becomes pinnatifid), the segments short obtuse, the margins rachis and stipes with long spreading ferruginous hairs, involucres few generally solitary from the apex of the pinnæ sunk urceolato-cylindrical, the mouth spreading scarcely 2-lipped fringed with long hairs.—*Sw. Fl. Ind. Occ. p.* 1730. *Syn. Fil. p.* 143. *Willd. Sp. Pl.* v. *p.* 507. *Hedw. Fil. cum Ic. (good).*

Hab. Jamaica, *Swartz*, *Menzies*, *Purdie*. St. Vincent, *L. Guilding*.—Stipes slender, filiform, 1—2 inches high; fronds 4—5 inches. In habit somewhat resembling *T. sinuosum*, but the lower portion of the frond is ge-

nerally pinnated; the pinnæ are remote, very thin, membranaceous, and almost pinnatifid. Involucres large. In all my specimens there is a glaucous tinge in the dried state.

Dubious Species of this sub-section.

51. T. *depauperatum*, Bory; "fronds pinnate elongate and slender, pinnules on the upper side trifurcate obtuse, sori solitary on the upper side at the base." *Bory, in Duperrey, Voy. Bot. p.* 283. — Onalan, D'Orfar, Isle de Wagiou, *D'Urville.*

Caudex elongate creeping. (*Sp.* 52—55).

52. T. *venosum*, Br.; caudex very slender creeping filiform, fronds small pinnate, pinnæ linear remote obtuse sinuate or rarely subbipinnatifid upper ones coadunate, lower one on the base above with a solitary segment bearing the sunk involucre which is urceolato-cylindrical, the mouth spreading entire, costa and veins wavy. *Br. Prodr. p.* 159. *Hook. et Grev. Ic. Fil. t.* 78.

Hab. New Holland; Port Jackson, *Brown, Bynoe.* Tasmania, *Gunn, Brown, J. D. Hooker.* New Zealand, *Menzies, A. Cunningham, J. D. Hooker;* always on the trunks of trees.—A small species, 2—5 inches long, very delicate, glistening. It has a peculiar habit, and is not easily confounded with any other species. The stipes is very slender, filiform.

53. T. *cæspitosum*, Hook.; caudex creeping slender much entangled and matted, fronds small oblong or oval, pinnæ rather few approximate or distant subimbricated oblong obtuse concave subcymbiform, the vein or costa solitary stout, beneath as well as the rachis and short stipes setose with rather long ferruginous hairs, involucres terminal and lateral obovato-cuneate broadly winged at the margins compressed, the mouth spreading with two broad semicircular short lips. (Tab. XL. B.) — Hymenophyllum cæspitosum, *Gaudich. in Freyc. Voy. Bot. p.* 374, *t.* 5, *f.* 2. — *β. elongatum;* fronds longer and more slender, pinnæ remote, involucres not lateral.

Hab. Staten Land, *Menzies.* Falkland Islands, *Gaudichaud, D'Urville, J. D. Hooker.* Rocks and trunks of trees, Hermite Island, Cape Horn, *J. D. Hooker.*—*β.* Chiloe, *Cuming, n.* 14.—A very remarkable and well-defined species, with a creeping caudex; stipes 2—3 lines long. Fronds scarcely an inch long in *α.*, in *β.* 2 inches. Pinnæ or leaves sessile, but scarcely decurrent, singularly concave, quite entire, with a strong costa, which beneath, as is the whole under side of the younger pinnæ, clothed with long, coarse, ferruginous setæ; when fully developed spreading, somewhat imbricated in *α.*, singularly concave, with the sides turned upwards, so as to be almost boat-shaped. Involucres terminal, or, more frequently, lateral, quite sunk in a somewhat altered pinna, so as to give the appearance of two wings, hairy with small bristles or coarse appressed hairs, which however do not extend to the wavy and somewhat toothed lips. Receptacles short, included, or longer than the involucre. The more elongated speci-

mens from Chiloe are assuredly only a variety, drawn out, as it would appear, by a warmer climate. The fructification is unquestionably that of a *Trichomanes;* but the figures in Gaudichaud give a very imperfect idea of the plant. The brown color of the fronds and the form and disposition of the pinnæ remind one of *Jungermannia sphagnoides.*

54. T. *auriculatum*, Bl.; "frond pinnate linear-lanceolate glabrous, pinnæ alternate cuneato-oblong obtuse multifid auricled at the base above, below obliquely cuneate, the segments truncate denticulate, rachis slightly margined subpubescent, caudex scandent rooting." *Bl. En. Fil. Jav. p.* 225. T. Belangeri, *Bory in Belang. Voy. Bot. p.* 79, *t.* 8, *f.* 1.

Hab. Mountain rocks in Java, *Blume*, *Belanger*. — An authentic specimen of this in Mr. J. Smith's herbarium has great affinity with *T. dissectum;* but the pinnæ are very obtuse, and scarcely again pinnatifid.

Dubious Species of this subsection.

55. T. *heterophyllum*, H. B. K.; "sterile frond pinnate, pinnæ obovato-oblong inciso-dentate superior ones confluent, fertile pinnate pinnæ cuneate toothed at the apex, caudex creeping." *H. B. K. Nov. Gen. Am.* i. *p.* 25. — Woods of the Orinoco. *Humboldt.*

***** *Fronds pinnated or bipinnate,*† *the pinnæ or pinnules pinnatifidly decompound.* (*Sp.* 56—87).

Fronds tufted. (*Sp.* 56—72).

56. T. *rigidum*, Sw.; tufted erect, fronds ovate acuminate harsh rigid dark green almost black when dry bipinnate, the pinnules lanceolate or linear-lanceolate cuneate subbipinnatifid more or less deeply, the ultimate segments various in length subacute simple or bifid, rachis terete wingless or as well as the secondary rachis with a very narrow wing or margin sometimes setose, involucres supraaxillary on the inner margin of the lower segments on the upper side of the ultimate divisions suburceolato-cylindrical free, the mouth entire and scarcely spreading not 2-lipped. — *Sw. Fl. Ind. Occ. p.* 1738. *Syn. Fil. p.* 144. *Hedw. Fil. cum Ic. (good). Willd. Sp. Pl.* v. *p.* 512. T. Mandioccanum, *Raddi, Fil. Bras. t.* 79 *(80 in text), f.* 2. T. pyramidale, *Wall. Cat. n.* 162. T. achillæifolium, *Willd. Sp. Pl.* v. *p.* 512. T. obscurum, *Bl.*

† It is very difficult to draw the limit between a frond *pinnated* (in the first instance), with the rachis slightly margined, since that margin is often obsolete, and that winged rachis which might justify the term *pinnatifid.* In *T. rigidum* and *T. anceps*, the term "pinnatifid" is perhaps more appropriate, and the place of them would be in a different section. They are cited here, on account of their close affinity with some of the following species.

Fil. Jav. p. 227. *J. Sm. in En. Fil. Philipp.*— β. ultimate and penultimate divisions broader and more crowded.

Hab. Tropics in the Old and New World. Jamaica, *Swartz, Menzies.* Dominica, *Dr. Imray.* Martinique, *Sieber;* and probably general in the West Indian islands. Brazil, *Raddi, Douglas, Gardner, n.* 505 *and* 5953, *Bunbury.* Peru, *Mathews, n.* 1089. Quito, *Jameson.* Mauritius, *Bory, Bojer, Sieber, Syn. Fil. n.* 272, *and others.* Pacific Islands, *Nightingale.* Philippine Islands, *Cuming, n.* 134 *and* 189. Sincapore, *Lobb, Wallich.* Ceylon, *Mrs. Genl. Walker.* Java? *Blume.* South Africa, *Drège,* — β. Pacific Islands, *Nightingale.* — The copious specimens I have examined, to enable me to determine the above references and localities, do not vary in any very remarkable degree. The Mauritius *T. achilleæfolium* is quite the same as our West Indian *T. rigidum,* in every essential particular. In specimens from various countries, there is a difference in the greater or less breadth of the segments, which are generally narrow and more or less acute at the apex. Involucres principally from the inner margin of a segment, which looks like a broad spine. Stipes 4—6 or 8 inches: the frond about the same length: the former with chaffy hairs at the base, rather rough, slightly margined above with an indistinct elevated line. Rachis also margined but winged in the upper part, and the secondary rachis is distinctly margined. Sori rather numerous. The whole plant is singularly black and rigid when dry. I presume Blume's *T. obscurum* to be the same with this plant, as the character does not materially differ. Our var. β. is scarcely distinguishable from *T. elongatum.*

57. T. *millefolium,* Desv.; "fronds subdeltoid oblong, lower pinnæ decurrently bipinnate, pinnules subdecurrent ultimate ones elongate coadunate somewhat dilated upwards denticulate, sori axillary, receptacles elongated, stipes and rachis naked terete." *Desv. Mém. Linn. Soc. Par.* ii. *p.* 329. "T. rigidum? *Raddi, Syn. Fil. Bras.* i. *p.* 19, (*excl. syn.*)."

Hab. Brazil? (*Desvaux*). — As the author quotes *T. rigidum,* Raddi; it is not unlikely that his plant is also the true *rigidum* of Swartz.

58. T. *elongatum,* A. Cunn.; tufted erect rigid dark green, fronds ovate bipinnate, pinnules very close compact imbricated oblong-cuneate inciso-pinnatifid, segments short acute sometimes bifid, involucres very copious (almost covering the under side of the frond) supra-axillary in the sinuses of the pinnules cylindrical free tapering at the base, the mouth entire scarcely spreading not 2-lipped, receptacles very much elongated curved, stipes terete as well as the rachis and every where glabrous. *A. Cunn. Nov. Zel. in Comp. Bot. Mag.* ii. *p.* 368. *Hook. Ic. Plant. v.* viii. *t.* 701.

Hab. New Zealand, Northern Island, *A. Cunningham, Colenso, J. D. Hooker and others.* — Stipes 4—6 inches high: fronds generally 3—5 inches, dark green, resembling *T. rigidum* in very many particulars, but the pinnules are broader, less divided, more cuneate, the segments generally shorter: the involucres more copious, from every deep sinus of the pinnules, with very long curved receptacles; and the stipes and lower part of the rachis are quite destitute of wing or even margin, and not in the least scabrous.

59. T. *anceps*, Hook. (not Wall. Cat.); tufted tall ample erect, fronds broadly ovate pinnate, pinnæ distant bi-tripinnatifid the ultimate segments linear sometimes exceedingly narrow acute simple or bifid, main rachis very broad compressed marginato-ancipitate, involucres supra-axillary free cylindrical tapering below, the mouth entire much spreading not 2-lipped, stipes compressed and flattened marginato-ancipitate above, often subterete or tetragonal (when dry) below. (Tab. XL. C). — T. elegans, *Rich. in Act. Par. according to Deless. in Herb. nostr. not Rudge.* T. rigidum, *Klotzsch in Herb. Reg. Berol. et in Herb. nostr.* T. villosulum? *Wall. Cat. n.* 163 (*a very bad specimen, slightly hairy on one side*). T. achilleæfolium, *J. Sm. En. Fil. Philipp. (name only), not Willd.* — β. subpiloso-squamose, segments and divisions everywhere very narrow linear-filiform, ultimate segments subsetaceous. (Tab. XL. C. 3).

Hab. Guiana, *Richard.* Brazil, *Sellow.* Dominica, *Dr. Imray, n.* 60 *and* 61. Gorgona, Pacific, *Barclay.* Singapore, *Cuming, n.* 368, *Wallich.* East Indies, *Wallich, n.* 163?— β. Philippine Islands, *Cuming, n.* 162 *and* 274.—It is possible that this may be a state of *T. rigidum*, but gigantic, 1½ foot to 2 feet high, with a very altered aspect, and in itself highly variable: some smaller specimens are apparently intermediate, while the usual form of our plant is very peculiar. Stipes 6—8 inches, subterete or 4-angular below, above remarkably compressed and more or less winged. Frond with a few minute, scattered, appressed hairs, 1—1½ foot high, harsh, rigid, black, and opaque. Rachis very broad, flattened and margined, ancipitate. Pinnæ remote, opposite or alternate, often 5—6 inches long, the divisions remote, ultimate segments subspinulose or setaceous, more or less elongated.—In β. the segments are almost setaceous, the margin of the rachis and the involucres narrower, the whole with rather copious, appressed, scaly hairs; and sometimes the involucres have no spreading mouth, but are erose as if injured by disease, as the entire plant probably is.

60. T. *fœniculaceum*, Bory; tufted (but from a creeping stout caudex) erect, fronds ovato-lanceolate rigid pinnated brown, pinnæ nearly horizontal approximate deeply tripinnatifid, the segments very narrow linear-setaceous scarcely broader than the vein or costa acute, rachis of the pinnæ compressed ancipitate, main rachis terete with a very narrow sharp edge or margin, stipes terete sometimes obscurely margined, above clothed (as is the rachis) more or less with deciduous brown setæ, involucres supra-axillary short cylindrical tapering below free, the mouth entire not 2-lipped nor spreading. *Bory, in Willd. Sp. Pl.* v. *p.* 511. T. meifolium, *Kaulf. En. Fil. p.* 265, *t.* 2, (*not of Bory*). T. gemmatum, *J. Sm. l. c.*

Hab. Mauritius and Bourbon, *Bory, Carmichael, Bojer.* Philippine Islands, *Cuming, n.* 400. — The characters of this, like many other species of *Trichomanes*, are not easily expressed in words. I derive my authority

for the species from a named specimen of the late Capt. Carmichael, and I have reason to believe it to be the same with that of Bory; but it is the *T. meifolium* of Kaulfuss, who has given a good representation of it. Its mode of growth is very erect, with a stout caudex and rachis and finely cut segments, which may be compared to a larch-tree in miniature. Stipes 3—5 inches, rising 3 or 4 together from a stout, horizontal, setose caudex. Fronds 6—7 inches high, with very close and very fine almost setaceous divisions. Sori copious on the upper part of the frond.

61. T. *myriophyllum*, Desv.; "fronds 4-pinnate, pinnules rather remote, secondary ones subsecundly pinnate and ultimate ones capillary, sori axillary, receptacles somewhat included, rachis downy hairy at the base, stipes terete." *Desv. in Mém. Soc. Linn. Par.* ii. *p.* 329.

Hab. Madagascar, (*Desvaux*). "Frond and stipes 8—10 inches high. Very near *T. fœniculaceum*, but different."

62. T. *bifidum*, Vent.; "fronds bipinnate, pinnules pinnatifid, segments linear all bifid at the apex and acute, rachis setose." *Vent. in Willd. Sp. Pl.* v. *p.* 511.

Hab. East Indies? (*Willdenow*). "In habit very like *T. rigidum*, but sufficiently distinct in the narrow segments of the pinnules, and in all, even the terminal ones, being bifid."—It is more than probable that this is one of the East Indian forms of *T. rigidum*. Blume had probably seen an authentic specimen, for he says, under his *T. obscurum* (*T. rigidum?*), "*T. bifidum*, Vent. cui simillimum, differt laciniis omnibus bifidis indusiorumque receptaculis multo brevioribus."

63. T. *strictum*, Menz.; tufted very erect, fronds lanceolate rigid straight pinnated, pinnæ approximate lanceolate bipinnatifid, the segments linear obtuse loosely reticulated, involucres urceolate free, the mouth slightly spreading entire not 2-lipped, the rachis margined, the stipes elongate terete quite naked.—*Hook. et Grev. Ic. Fil. t.* 122. T. leptophyllum, *A. Cunn. Fl. Nov. Zel. in Hook. Comp. to Bot. Mag.* ii. *p.* 368.

Hab. Dusky Bay, New Zealand, and Otaheite, *Menzies*. Hokianga, Northern island, New Zealand, *A. Cunningham*.—Very distinct, first found by Mr. Menzies in the southern extremity of the middle island of New Zealand, and in Otaheite. This has the largest stipes and narrowest frond of any of this division: the shape of the segments and the nature of the reticulations most resembling the following species, *T. meifolium* and *T. giganteum*. Authentic specimens of *T. leptophyllum* of A. Cunningham, in Mr. Heward's herbarium, prove that to be the same with *T. strictum*, Menz.

64. T. *giganteum*, Bory in Willd.; tufted? erect very tall, fronds broadly ovato-lanceolate bipinnate, primary pinnæ distant lanceolate acuminate elongate, secondary (or pinnules) ovate the lowermost superior ones applied to the rachis subtripinnatifid, the segments linear obtuse, involucres supra

axillary cylindrical tapering below free, the mouth entire slightly spreading, rachis terete furrowed above not winged nor margined for its whole length, pilose with scattered soft brown hairs as well as the terete stipes.—*Bory in Willd.* v. *p.* 514. *Hook. Ic. Plant.* viii. *t.* 702. T. Mauritianum, *Flugge, MS.* (*Willd.*)

Hab. In one wood at the great lake, Bourbon, *Bory, Carmichael.* — My specimen of this is from Capt. Carmichael, and wants the lower part of the stipes. Frond 14 inches long (much larger than Willdenow describes it), dark brown, flaccid, truly bipinnate: the ultimate segments and involucres as in *T. strictum*, but the former are much more compound and more flaccid.

65. T. *meifolium*, Bory in Willd.; tall tufted erect rigid ovato-lanceolate bipinnate, pinnules lanceolate subbipinnatifid, the segments narrow-linear obtuse, involucres small cyathiform free supra-axillary, stipes and rachis terete clothed with long spreading rufous setæ. — *Willd. Sp. Pl.* v. *p.* 508. "T. ericoides, *Hedw. Fil.*" T. lanceolatum, *Poiret, Encycl.* viii. *p.* 83, (*according to Desvaux*). T. geminatum, *J. Sm. En. Pl. Fil.* (*name only*). — β. *Bauerianum;* fronds larger (11—14 inches), stipes and rachis with few hairs or naked. T. Bauerianum, *Endl. Prodr. Ins. Norf. p.* 17.

Hab. Bourbon, *Bory.* Java, *Blume.* Philippine Islands, *Cuming, n.* 137 *and* 207. Oahu, *Macrae.* — β. E. Indies, *Mr. Ward.* Pacific Islands, *Bennett, Nightingale.* Norfolk Island, *F. Bauer, Mr. Vaughan Thompson.* —The stout stipes (3—5 inches long) clothed with long, harsh, dark brown spreading hairs or setæ; probably deciduous in β. Fronds 8—10 inches, in β. 11—14; segments rather crowded, involucres small, short, spreading and quite entire at the mouth.

66. T. *longisetum*, Bory; "fronds triplicato-pinnate, pinnæ patent lax, pinnules linear capillaceous dichotomous incurved, rachis winged above setose below, receptacles filiform five times longer than the involucres." *Bory in Willd. Sp. Pl.* v. *p.* 510.

Hab. Bourbon, *Bory.*—Willdenow places this next *T. fœniculaceum* and *T. meifolium*, and says that from the latter it is sufficiently distinct in the rachis winged above, in the narrow and more distant pinnæ, in the linear-capillaceous pinnules and in the very long receptacles.

67. T. *maximum*, Bl.; "frond tripinnate ovate oblong very ample, pinnæ subalternate oblong-lanceolate, pinnules cuneate-oblong partito-pinnatifid, the segments subdichotomo-partite, the secondary ones linear subbifid, rachises all winged, stipes elongate glabrous and terete below." *Bl. En. Fil. Jav. p.* 228. — β. *minus;* fronds smaller, pinnæ subopposite, pinnules rather rough beneath with segments inciso-pinnatifid, secondary ones linear subemarginate, stipes winged." *Bl. l. c.*

Hab. Java, and β. Island of Nusa Kambangang, *Blume*.—" Very near *T. meifolium*, Bory in Willd., which differs in the smaller fronds and hairy rachis."

68. T. *polyanthos*, Hook.; tufted tall rigid, fronds oblong or ovato-lanceolate tapering below pinnate, pinnæ lanceolate horizontal subfalcato-decurved bi-tripinnatifid, the segments linear obtuse, involucres supra-axillary copious large free campanulate upper half very thin and membranaceous, the mouth spreading, receptacles wholly included, stipes and slightly margined rachis stout terete scabrous and more or less hispid. — *Hook. Ic. Plant. v.* viii. *t.* 703. Hymenophyllum polyanthos, *Hook. in Nightingale's Oceanic Sketches, App. p.* 132, (*non Sw.*)

Hab. Pacific Islands, *Sir Thos. Nightingale*. — Stipes 3—4 or 5 inches, very stout, as is the rachis. Frond 1 foot high, 4—5 inches broad. Very remarkable in the nature of the involucres, which are quite unlike any others; large, exactly campanulate, glossy, membranaceous, especially the upper pellucid half, in texture and form more resembling those of *Hymenophyllum* than of *Trichomanes*, but they are not at all 2-valved: the receptacles also are quite included in the involucres in every instance.

69. T. *Smithii*, Hook.; tufted erect rather small flaccid, fronds slender lanceolate pinnate, lower pinnæ remote short, upper ones crowded and larger, all subpalmato-pinnatifid, segments elongated remote spreading ultimate ones much elongated, the cells large linear transverse arranged in slightly oblique longitudinal lines between the costa and the margin, the margins alone with a series of small quadrangular cells, involucres supra-axillary on short segments narrow urceolate dark brown coriaceous slightly winged below, the mouth spreading, stipes filiform slightly hairy. — *Hook. Ic. v.* viii. *t.* 704.—T. angustatum, *J. Sm. En. Fil. Philipp.* (*not Carm.*)

Hab. Philippine Islands, *Cuming, n.* 208 *and* 358.—Stipes slender, dark brown or black, 1—3 inches high, slightly hispid, especially at the base. Fronds scarcely a span long, extremely delicate; lower pinnæ gradually smaller, remote, but soriferous, with few, short, narrow segments, divided from the very base and spreading; upper ones much larger, more crowded, the segments also rather broader and more elongated, especially the ultimate ones. The cellular structure of this is quite unlike anything with which I am acquainted, and is best understood by a reference to our figure. Involucres small, of a coriaceous texture.

70. T. *lucens*, Sw.; tufted, caudex scarcely creeping setose, fronds much elongated oblong-lanceolate attenuated very flaccid pellucid pinnated, pinnæ sessile numerous approximated spreading rufo-villous especially on the back at the base linear acuminate membranaceous deeply sinuato-pinnatifid transversely waved and crisped, lower ones tripin-

natifid, involucres copious marginal on almost all the pinnæ quite sunk broadly oblong-cuneate the narrow base often nearly reaching the costa of the same texture as the frond, the mouth laterally 2-lipped more or less spreading, receptacles much elongated, stipes generally short stout not winged clothed with dense ferruginous wool. (Tab. XLI. A.)—*Sw. Fl. Ind. Occ. p.* 1734. *Syn. Fil. p.* 143. *Willd. Sp. Pl.* v. *p.* 506. *Hedw. Fil. cum Ic.* (*bad*), *not Hook. et Grev. Ic. Fil. t.* 10.

Hab. Jamaica, *Swartz*, *Dr. Bancroft*. Colombia, *Hartweg*, *n.* 1531.—Stipes 2—5 inches long, stout, rufo-tomentose. Fronds among the largest and most elegant of this beautiful genus, 1—1½ foot long. Pinnæ very crowded, thin and membranaceous, undulato-crisped: fructifications sometimes so copious as to occupy every lobe and vein of the pinnæ, and these are large and almost equally transparent with the frond.

71. T. *Lambertianum*, Hook.; caudex scarcely creeping lanuginose, fronds linear oblong obtuse rigid opaque pinnated, pinnæ sessile densely crowded imbricated erecto-patent subsecund densely rufo-tomentose especially everywhere beneath oblong-ovate obtuse rigid membranaceous bipinnatifid subplicate, the segments oblong obtuse entire or bifid with a stout costa, involucres copious from the upper pinnæ marginal almost wholly sunk in a lateral segment oblong-cuneate of the same texture as the frond, the mouth laterally 2-lipped more or less spreading, receptacles elongated, stipes stout elongated clothed with dense ferruginous wool. (Tab. XLI. B.)

Hab. Woods at Pillao, Peru, *Ruiz et Pavon in Herb. Lambert.*—I am indebted to Mr. Fielding for a specimen of this curious *Trichomanes*, which was derived, as well as his own specimens, and those in the Banksian herbarium, from the museum of the late Mr. Lambert. The present has many points in common with the preceding, yet is, I think, truly distinct. The stipes is stout, 4—5 inches long, clothed with dense, woolly, rusty tomentum. The frond, apparently erect, 8—10 inches long, scarcely 2 inches wide, and nearly of the same width throughout, peculiarly stiff and rigid, ferruginous from copious rust-coloured hairs, which, on the under side, form a dense covering of wool. The pinnæ point upwards and forward, so as to be subsecund, and they are so closely placed as to be imbricated, they are sessile, rather deeply pinnatifid, with the segments oblong and obtuse, often again divided, so that the pinnæ may be said to be pinnatifid. The fructifications are confined to the upper portion of the frond, and are there conspicuous by the copious long receptacles.

72. T. *pallidum*, Bl.; fronds bipinnatifid oblong sparingly setose glaucous, younger plants pinnatifido-digitate, pinnæ subalternate cuneato-oblong pinnatifid, the segments cuneiform subbifid, ultimate ones linear obtuse emarginate, rachis winged, stipes terete glabrous." *Bl. En. Fil. Jav. p.* 225.—*β. glaucum*; pinnæ nearly opposite approximate pinnatifid, segments obtuse emarginate. *Bl. l. c.*

Hab. Woods, Java, *Blume*. "Closely allied to *T. lucens*," Sw. — I believe the true *T. lucens* is little known or understood. I have never seen any East Indian *Trichomanes* at all resembling it; nor does Blume's character of *T. pallidum* in the least agree with it.

Fronds from an elongated creeping caudex. (*Sp.* 73—87).

73. T. *dissectum*, J. Sm.; caudex long creeping stout setose, fronds erect rigid black when dry scarcely stipulate lanceolate pinnate, pinnæ petiolate semiovato-lanceolate obliquely cuneate at the base inciso-pinnatifid on the superior margin and the upper half of the inferior margin, the segments unequal oblong or linear subincised, involucres terminal on the segments and supra-axillary scarcely sunk small urceolato-cylindrical copious, rachis terete and as well as the stipes hispid.—*J. Sm. in En. Fil. Philipp.* (*name only*). *Hook. Ic. Plant. v.* viii. *ined.*

Hab. Luzon, *Cuming*, *n.*129.—At first sight this seems allied to *T. Javanicum* (*n.* 45), being pinnated, rigid and black, but it is in reality very different. Caudex long, stout. Fronds with scarcely any stipes, 6—8 inches long. Rachis hispid, pinnæ tapering into a short stalk, pinnatifid only on the upper side, except towards the apex; the segments laciniated or incised, each segment frequently bearing an involucre. Receptacle protruded. Its resemblance to *T. auriculatum*, Bl. is considerable, but, as already observed, the pinnæ are more acuminated and more divided, so as to be pinnatifid.

74. T. *melanorhizon*, Hook.; caudex creeping, and as well as the thick numerous branching roots densely woolly with black hairs, fronds short ovate almost sessile pinnate, pinnæ bipinnatifid, the segments narrow-linear acute glabrous, involucres in the axils of the upper segments urceolato-cylindrical partially sunk, the mouth with 2 semiorbicular lips.—T. bilingue, *J. Sm. in En. Fil. Philipp. Hook. Ic. Pl.* viii. *t.* 705.

Hab. Leyte, Philippine Islands, *Cuming*, *n.* 316. — Caudex and short branching fibres quite velvety with copious black hairs. Stipes scarcely ½ an inch long. Frond 3 inches. Pinnæ distant, sometimes opposite, very slightly decurrent. Rachis terete. Segments narrow. Involucres confined to 3 or 4 of the ultimate segments, the mouth with rather large lips less acute but resembling those of *T. Filicula*, Bory (*T. bilabiatum*, Nees), from which however in other respects the plant is widely different.

75. T. *scandens*, Linn.; caudex long creeping tomentose, fronds rather tall ovate acuminate bipinnate, pinnæ lanceolate bipinnatifid the ultimate ones decurrent, segments ciliated at the margin oblong or broad-linear emarginate or incised obtuse, involucres small entirely sunk in short lateral segments urceolate obscurely 2-lipped, the lips spreading, costa and terete rachis and stipes with appressed tawny hairs. —*Linn. Sp. Pl. p.* 1562. *Sw. Fl. Ind. Occ. p.* 1757. *Syn. Fil. p.* 144. *Willd. Sp. Pl.* v. 513, (*not Hedw.*) *Sloane, Jam.* i. *p.* 96, *t.* 58, *good*, (*not Plum. Fil. p.* 93).

Hab. Jamaica, *Sloane, Swartz, Bancroft, Macfadyen, Purdie, &c.* Mexico, *Schiede et Deppe, Galeotti.*—An elegant, very distinct, but little understood species, often perhaps confounded with *T. radicans*, but totally different in a variety of particulars. It has indeed the same long creeping caudex; but the frond (6 inches to a foot long) is remarkably thin, membranaceous, pellucid, yellow-green, glossy, and truly bipinnate; the involucres wholly sunk in the frond. Stipes 3—4 or 5 inches long.—Linnæus, Willdenow and others have referred to Plumier, t. 93, for this plant; but it is quite different, and possibly our *T. Kunzeanum;* though it does not correctly resemble any species known to me. Sloane's figure, on the other hand, is very characteristic. I have only seen West Indian and Mexican specimens.

76. T. *angustatum*, Carm.; caudex creeping slender and matted, fronds pendent? flaccid lanceolate pinnate, pinnæ bipinnatifid, the segments narrow-linear glabrous simple or bifid obtuse, involucres urceolato-cylindrical sunk in the frond, the mouth spreading obscurely 2-lipped, the rachis throughout and stipes slender filiform terete naked.—*Carm. in Linn. Trans.* xii. *p.* 513. *Hook. et Grev. Ic. Fil. t.* 166. T. fulvum, *Klotzsch, in Herb. Reg. Berol. et in Herb. Hook.* T. tenerum, *Spr.* (*according to Klotzsch*).

Hab. Tristan d'Acunha, *Carmichael.* Brazil, *Gardner, n.* 204 *and* 5952, *Sellow.* Esmeraldas, El Equador and Pichincha, *Jameson.* Peru, *Mathews, n.* 1784. Gouga Sokoo, *Barclay.*—Caudex short, ½ an inch to 2 inches long, slender, filiform. Frond varying in length, 3—5 inches, very flaccid, slender, graceful and probably pendent.

77. T. *exsectum*, Kze.; caudex creeping, fronds pendent flaccid lanceolate or oblong pinnate, pinnæ bipinnatifid, the segments narrow linear glabrous simple or bifid obtuse, involucres oblong sunk in the frond, the mouth spreading scarcely 2-lipped, the rachis winged above naked below as is the whole stipes.—*Kze. Anal. Pteridogr. p.* 47, *t.* 29, *f.* 2.

Hab. Juan Fernandez, *Bertero, n.* 1542, *in Herb. nostr., Gay, (Kunze), Capt. P. P. King, R.N. (in. Herb. Heward), Cuming, n.* 1335. Chiloe, *Cuming, (Kunze).* Valdivia, *Bridges, n.* 800.—Professor Kunze has well distinguished this species from *T. angustatum*, and his figure gives a good representation of our smaller specimens (for they vary from 4 inches to more than a foot), but the receptacle is longer than in ours, probably from being more perfect. It is a larger plant generally than *T. angustatum*, the rachis is decidedly winged above, the involucres are more oblong, almost cylindrical, but tapering at the base, and the lips are much smaller.

78. T. *trichoideum*, Sw.; caudex creeping, frond broadly lanceolate tripinnate, segments linear-capillary a little broader upwards bifid or forked, involucres terminal on short lateral segments stipitate urceolato-cylindrical, the mouth spreading entire, stipes slender filiform.—*Sw. Fl. Ind. Occ. p.* 1741. *Syn. Fil. p.* 144. *Willd. Sp. Pl.* v. *p.* 509. *Hook. et Grev. Ic. Fil. t.* 199. T. pyxidiferum, *Schkuhr, Fil. t.* 134, (T. cuneiforme *in text*). T. tenellum, *Hedw. Fil. cum Ic.*

Hab. Jamaica, *Swartz, Bancroft, Menzies, Purdie.* Mexico, *Schiede in Herb. Hook.* Vera Cruz and Xalapa, *Galeotti, n.* 6394. St. Domingo, (*Schkuhr*). — Stipes 1—2 inches tall, very slender. Fronds 3—6 inches, cut into very fine capillary segments, scarcely so broad as the filiform rachis.

Dubious Species of this Section.

79. T. *tamarisciforme*, Jacq.; "fronds bipinnate, pinnules pinnatifid lobate, lobules oblong, involucres sunk? (urceolis insertis), stipes and rachis rounded somewhat hairy." *Sw. Syn. Fil. p.* 515. *Jacq. Coll.* iii. *p.* 285, *t.* 21, *f. a. Willd. Sp. Pl.* v. *p.* 515. — Mauritius, (*Swartz*). Bourbon (*Willdenow*), *Jacquin.* — The figure of Jacquin is a very unsatisfactory one.

80. T. *tenuifolium*, Cav.; "fronds tripinnate, pinnules capillary with one sorus, receptacles very much elongated." *Cav. Præl.* 1801, *n.* 697. *Sw. Syn. Fil. p.* 144. *Willd. Sp. Pl.* v. *p.* 508. — Hab. Chiloe, *Cavanilles.* — "Frond 3—4 inches long. Lower pinnæ opposite, upper alternate. Pinnules capillary. Fructifications solitary in the apices of the pinnules, involucres oblong, pedicellate, receptacles 3—4 times longer than than the involucres.

81. T. *diffusum*, Bl.; frond bipinnatifid diaphanous glabrous, pinnæ alternate or opposite remote lanceolate, lowermost ones stipitate upper confluent lobato-pinnatifid, segments linear obtuse dentate, involucres solitary or in pairs, rachis margined above, stipes terete glabrous." *Bl. En. Fil. Jav. p.* 225. — β. pinnæ all sessile, segments nearly entire, rachis margined for its whole length. *Bl. l. c.* — Mountains of Java, *Blume.*

82. T. *cupressoides*, Desv.; "fronds elongated deltoid decumbently tripinnatifid, ultimate pinnæ appressed veined toothed at the apex, lowermost bicuspidato-subulate at the base, receptacles mostly included, rachis subpruinoso-pilose, partial ones naked, stipes terete." *Desv. in Mém. Linn. Soc. Par.* ii. *p.* 330. — Seychelles Islands, (*Desvaux*). "Fronds cæspitose."

83. T. *parviflorum*, Poir.; "fronds subtripinnate, pinnules pectinate, stipes hairy, involucres very small, terminating the lower divisions." *Poir. Encycl. Bot.* viii. *p.* 83. — Madagascar, *Du P. Thouars.*

84. T. *lanceolatum*, Pet. Th.; "fronds lanceolate subtripinnate, pinnules very short, stipes somewhat hairy, margins of the involucres lacerated, receptacles very long recurved." *Poir. l. c. p.* 83. — Madagascar, *Du Pet. Thouars.* — "Approaches *T. parviflorum*, but pinnules narrower."

85. T. *stylosum*, Poir.; "fronds subtripinnate, pinnæ alternate, pinnules decurrent, segments solitary, receptacles exserted."—*Poir. Encycl. Bot.* viii. *p.* 32.—Madagascar, *Du Petit Thouars.*

86. T. *davallioides*, Gaud.; "fronds scattered lanceolate bipinnate subtripinnate 1 foot high, pinnules lanceolate pinnatifid and cut, segments oblong obtuse at the apex 2-3-fid, sori oblong axillary subpedicellate, rachis and stipes margined, caudex climbing hairy." *Gaudich. in Freycin. Voy. Bot. p.* 378.—Sandwich Islands, *Gaudichaud.*

87. T. *venustum*, Desv.; "fronds everywhere decurrent subtripinnate, segments linear emarginate bifid and obtuse, sori axillary and terminal, receptacles included, stipes short margined, caudex climbing?"—*Desv. in Mém. Linn. Soc. Par. p.* 328.—Brazil, (*Desvaux*).

T. *undulatum*. Wall. Cat. n. 160.—"Mauritius," *Wallich.*—Quite unknown to me.

T. *compressum*, Desv. "Mag. Nat. Berol. 1811, p. 329."—I have no access to the work just mentioned, and the name only is given by Desvaux, in Mém. Linn. Soc. Par. ii. p. 330.

T. *alchemillæfolium*, Wall. Cat. n. 159. Mauritius, *Telfair.*—Probably *T. meifolium* or *T. achilleæfolium.*

T. *cormophyllum*, Kaulf. En. Syn. Fil. p. 266, and Drège, Herb. Cap.—See under *Alsophila Capensis*, p. 37).

T. *capillatum*, "Taschner Dissertatio de Trichom. Jena, 1843," (quoted by Presl, Hymen. p. 65, under *Didymoglossum capillatum*, Pr.)

T. *flabellatum*, Bory, in Belanger, Voy. Bot. p. 77, from the Mysore, who considers that it may be the same as *T. digitatum*, Sw.

T. *adiantinum*, Bory, in Belanger, Voy. Bot. p. 78; "fronds stipitate entire flabellato-abbreviate, fructiferous at the crenate margin." Mauritius and Bourbon, *Belanger.*

T. *loreum*, Bory, in Belanger, Voy. Bot. p. 79, is the same as *T. lanceum*, Willd.

T. *radicans*, supra, p. 125.

The name of our friend *J. T. Mackay Esq.* ought assuredly to have been associated with the discoverers of this interesting plant in Ireland. It was, as I have since learned, in the summer or autumn of 1804, that Dr. Stokes, accompanied by Miss Fitton (not Felton), detected a single plant without fruit near the Powerscourt waterfall, and sent a specimen to Sir J. E. Smith.

In October of the same year Mr. Mackay had the good fortune to find an abundant station, and in fine fructification, in the county of Kerry; and his specimens were published in 'English Botany' in the following year, and distributed among botanists, and to cultivators at home and abroad. In 1806, Mr. Nuttall detected the plant in Hermitage-glen, county of Wicklow, where, as at Powerscourt, and I fear in Mr. Andrews' station, it has been almost exterminated by the rapacity of collectors. Botanists are sometimes taunted with illiberality in concealing the stations of rare plants; but there is often a necessity for it. About eight years ago, Mr. Robt. Ball detected a new station in the county of Waterford.

Dr. Presl's recent work, entitled 'Hymenophyllaceæ,' published at "Prague, 1843," in 4to., with 12 plates, has only reached our hands at the period when our two genera, *Hymenophyllum* and *Trichomanes*, were almost wholly in type; so that it has been impossible to refer to it under our species. It is too important a publication to pass over in silence, and I cannot do better than to give here an enumeration of the Genera (19 in number) and Species into which this acute observer has thought proper to divide the group; premising, however, that I cannot agree with the author in thus multiplying genera, which do not appear well marked either with regard to habit, or to characteristic distinctions. The venation is too uniform to afford any good or tangible marks, and the variations of form in the involucre or indusium is more useful as affording specific, rather than generic characters.

Conspectus of the Genera and Species of Presl's

'HYMENOPHYLLACEÆ,'

(including *Hymenophyllum* and *Trichomanes*, Sm.)

Trib. I. TRICHOMANOIDEÆ, *Pr.*

(This group corresponds with the genus *Trichomanes*, Sm. "*Involucre tubular with an elongated receptacle capsuliferous at the base*").

Sect. 1. TRICHOMANEÆ, *Pr.*

I. FEEA, *Bory.* — F. polypodina, *Bory* (Trich. spicatum, *Hedw.*). F. nana, *Bory.*

II. HYMENOSTACHYS, *Bory.* — H. elegans, *Pr.* (Trich. elegans, *Rudge*). H. osmundioides, *Pr.* (H. diversifrons, *Bory*, according to Presl, and if so, surely not distinct from H. elegans). — The author does not appear to have had specimens of this genus under his view; for he remarks, "if the sterile fronds have anastomosing veins, as shown in Hook. Gen. Fil. t. 108, the genus *Hymenostachys* must be widely separated from *Feea*, and be placed after *Trichomanes* and near *Nemophyllum:*"—than which nothing can be more at variance with nature.

III. LECANIUM, *Pr.* Tab. I.—L. membranaceum, *Pr.* (Trichomanes, *L.*)

IV. CARDIOMANES, *Pr.*—C. reniforme, *Pr.* (Trichomanes, *Forst.*)

V. TRICHOMANES, *Pr.* Tab. II. A, B. Tab. III. A, B, C. Tab. IV. A.— § I. ACHOMANES, *Pr.* T. pellucidum, *Kze.* T. Kaulfussii, *Hook.* T. fastigiatum, *Sieb.* (*MS.*). T. heterophyllum, *Willd.* T. cristatum, *Kaulf.* T. Martiusii,[1] *Pr.* (T pilosum, *Mart. Crypt. Bras. t.* 68, *fig. dextra*). T. Plumula,[2] *Pr.* (T. pilosum, *Mart. l. c. t.* 68, *fig. sinistra*).

[1] Trich. crispum, *nob. supra.* [2] T. crispum, *nob. supra.*

T. pilosum, *Raddi*. T. crispum, *L.* T. pilosum, *Kze.* T. Hænkeanum,[3] *Pr.* (T. crispum, *Pr. in Rel. Hænk.*) T. Sellowianum,[4] *Pr.* T. asplenioides,[5] *Pr.* T. dimidiatum,[6] *Pr.* T. Javanicum, *Bl.* (T. rigidum, *Wall.*) — § II. Eutrichomanes, *Pr.* A. Flabellata, *Pr.* T. Bojeri, *Hook. et Grev.* (T. undulatum, *Wall.*) T. digitatum, *Sw.* (T. lanceum, *Bory*). T. saxifragoides,[7] *Pr.* T. palmatum,[8] *Pr.* — B. Pinnata, *Pr.* T. Hookeri, *Pr.* (T. muscoides, *Hook. et Grev.*) T. erosum, *Willd.* T. parvulum, *Poir.* (T. Sibthorpioides, *Bory*). T. Thouarsianum,[9] *Pr.* T. Poeppigii,[10] *Pr.* (T. sinuosum, *Knze. in Poepp. Fil.*) T. sinuosum, *Pr.* (T. incisum, *Kaulf.*) T. cognatum,[11] *Pr.* T. lucens, *Sw.* T. alatum, *Sw.* T. Bancroftii, *Hook. et Grev.* (T. coriaceum, *Kze.* T. pinnatifidum, *Willd. Herb.*) T. Ankersii, *Parker.* T. intramarginale, *Hook. et Grev.* T. Luzonicum,[12] *Pr.* T. acutum,[13] *Pr.* T. venosum, *Br.* T. Belangeri, *Bory.* T. melanostictum, *Schlecht.* T. brachypus, *Kze.* (T. radicans, *Hook. et Grev.*) T. radicans, *Sw.* T. pyxidiferum, *L.* T. ambiguum, *Sieb. Syn. Fil. n.* 143. T. Brasiliense, *Desv.* T. Bauerianum, *Endl.* T. trichoideum, *Sw.* T. tenerum, *Spr.* T. exsectum, *Kze.* T. angustatum, *Carm.* T. Mandioccanum, *Raddi.* T. scandens, *L.* (T. radicans, *Kze.* Hymenophyllum radicans, *Poepp. Fil. exsic.*) T. umbrosum, *Wall.* T. strictum, *Menz.* T. tamarisciforme, *Jacq.* T. achilleifolium, *Willd.* T. longisetum, *Bory.* T. Millefolium,[14] *Pr.* T. apiifolium,[15] *Pr.* T. bifidum, *Vent.* T. eminens,[16] *Pr.* T. fœniculaceum, *Bory.* T. meifolium, *Bory.* T. intermedium, *Kaulf.* — § III. Pachychætum,

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[3] The plant of Hænke I had supposed to be T. crispum, *L.*

[4] T. *Sellowianum*, Pr. Hymen. p. 37; "frond linear-lanceolate elongate acute deeply pinnatifid obtuse at the base, segments oblong obtuse unequally denticulate ciliated waved separated by a rounded sinus alternate contiguous horizontal, lowest ones rather smaller deflexed, veins di- trichotomous, on one side with the costa pubescent, receptacles very long, stipes convex on one side channelled on the other and as well as the convex rachis hirsute with appressed hairs. Brazil, *Sellow.*"

[5] T. Javanicum, *nob. supra*, p. 130. (T. curvatum, *J. Sm.*)

[6] T. dissectum, *J. Sm. et nob. sup. p.* 140

[7] T. parvulum, *nob. supra, p.* 118. [8] T. proliferum, *nob. supra, p.* 118.

[9] T. *Thouarsianum*, Pr. Hymen. p. 40; "frond ovate obtuse deeply pinnatifid acute at the base, with two opposite segments and the terminal one cuneate bifid, the lobes linear entire or toothed and with the teeth emarginate, limb of the involucre patent entire, stipes shorter than the frond and as well as the rhizoma filiform. Bourbon, *P. Thouars.*"

[10] T. sinuosum, *nob. supra, p.* 140.

[11] T. *cognatum*, Pr. Hymen. p. 41; "frond oblong-lanceolate obtuse glabrous or ciliated with bi- trifid hairs pinnatifid the narrow base tapering into a stipes, segments ovate-oblong obtuse and obtusely dentate separated by an obtuse sinus, veins simply branched, sori immersed, limb of the infundibuliform involucre truncated, stipes below filiform articulated above the base, rhizoma angled paleaceo-pilose. Brazil, *Beyrich.*" "Quam maxime cognatum *T. sinuoso*, a quo pluribus notis differt et transitum in *T. alatum* quodammodo efficere videtur."

[12] T. humile, *nob. supra, p.* 123. [13] T. glauco-fuscum, *nob. supra, p.* 128.

[14] Not of Desvaux. It is T. anceps, *nob. supra, p.* 135.

[15] T. meifolium, *nob. supra, p.* 137. [16] T. meifolium, *nob. supra, p.* 137.

Pr. T. Luschnatianum,[17] *Pr.* T. rigidum, *Sw.* T. firmulum,[18] *Pr.* T. pyramidale, *Wall.* T. speciosum, *Willd.* T. brevisetum, *Spr.*

VI. RAGATELLUS, *Pr.*—R. crinitus, *Pr.* (Trichomanes, *Sw.*)

VII. CEPHALOMENES, *Pr.* Tab. V.—C. atrovirens, *Pr.*—(This would appear to be a remarkable plant, to judge from the description and figure: but my astonishment is great on finding that this supposed new genus is Mr. Cuming's n. 169 from the Philippine Islands, identical with *Trichomanes Javanicum*, Blume, and of Presl himself; and the *T. rhomboideum*, J. Sm.—To such errors must the multiplying of genera on the most trivial characters necessarily lead. The receptacle is not, in my specimens, terminated with the globose apex represented by Presl, tab. 5; nor is there any character by which it can be distinguished specifically from the *Trichomanes* now mentioned.

VIII. NEUROPHYLLUM, *Pr.* Tab. IV. C.—N. Vittaria, *Pr.* (Trichomanes Vitt. *DeCand.* T. floribundum, *β. Hook. supra, p.* 129). N. pinnatum, *Pr.* (Trich. floribundum, *H.B.K.*) N. pennatum, *Pr.* (Trich. pennatum, *Kaulf.*; too near our T. floribundum).

IX. MICROGONIUM, *Pr.* Tab. VI. A, B.—M. cuspidatum, *Pr.* (Trichomanes cusp. *Willd.*)—It appears to me that there can hardly be a question of this being our *Trichomanes Bojeri*, Hook. et Grev. Ic. Fil. t. 155, et supra, and of Presl, from the Mauritius; and it may be equally the *T. cuspidatum*, Willd., whose description however is very unsatisfactory. If I am right in my conjecture, the margin in the figure just quoted, A, is much broader than I have seen it.—M. Berteroanum, *Pr.* fig. B.—No one can possibly look at this figure and compare it with that of *Trichomanes muscoides*, Hook. et Grev. Ic. Fil. tab. 179, without seeing that the two plants are *identical*, and they are from the same country. The venation and margin are as distinctly and accurately laid down in the 'Icones Filicum,' as in the work now under consideration, and the figure was well known to Dr. Presl: yet by a strange inconsistency he makes a new genus of it in the one case, and, in the other, a new species of his own genus *Trichomanes*, *T. Hookeri*, p. 16.

X. ABRODICTYUM, *Pr.* Tab. VII.—A. Cumingii, *Pr.* Cuming's n. 208 and 358, from the Philippine Islands. This plant corresponds with our *Trichomanes Smithii*, a plant certainly very remarkable in the reticulation of its leaves. It is the *T. angustatum* of J. Sm., as above quoted (p. 138), but not of Carmichael.

Sect. II. DIDYMOGLOSSEÆ, *Pr.*

XI. DIDYMOGLOSSUM, *Desv.* Tab. VIII. A.—§ I. Eudidymoglossum. A. Flabellata, *Pr.* D. punctatum, *Pr.* (Trichomanes punctatum, *Poir.*) D. sphenoides, *Pr.* (Trich. sphenoides, *Kze.* Hymenophyllum Guadeloupense, *Spr.*) D. Hookeri, *Pr.* (Trich. reptans, *Hook. et Gr.*)

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[17] T. *Luschnatianum*, Pr. Hymen. p. 45; "frond sessile oblong-lanceolate acute pinnate obtuse at the base, pinnæ subsessile lanceolate acuminate deeply pinnatifid, lower segments ovate obtuse lobed below above dentate, lobes dentate, teeth obtuse, sori immersed, rhizoma terete scandent. Rio, Brazil, *Luschn.*" This seems to be our sessile variety of *T. radicans.*

[18] This would appear from the description to be our Brazilian state of T. *rigidum.*

B. Pinnata, *Pr.* D. reptans, *Pr.* (Trich. reptans, *Sw.*) D. Kraussii, *Pr.* Trich. (*Hook. et Grev.*) D. muscoides, *Pr.* (Trich. *Sw.* Tr. apodum, *Hook. et Grev.*) D. quercifolium, *Pr.* (Trich. *Hook. et Grev.*) D. minutulum, *Gaud.* D. alatum, *Pr.* (Hymen. alatum, *Schk. Fil. t.* 135, *b.*) D. decipiens, *Desv.* D. Filicula, *Pr.* (Trich. bilabiatum, *Nees et Bl.* Hymen. Filicula, *Bory*). D. brevipes,[19] *Pr.* D. undulatum,[20] *Pr.* D. serrulatum,[21] *Br.* § II. Chilodium, *Pr.* D. Neesii, (Trich. *Bl.* Trich. denticulatum, *Nees et Bl. non Cav.*) D. longisetum,[22] *Br.* § III. Crepidium, *Pr.* D. humile, *Pr.* (Trich. *Forst.*)

XII. MERINGIUM. Tab. VIII. B. — M. Meyenianum, *Pr.* M? Blumeanum, *Pr.* (Hymenophyllum pectinatum, *Nees et Bl.* Hym. Blumeanum, *Spr.*) (With the species of this genus I am unacquainted. *Meringium*, the author says, is allied to *Didymoglossum*; differing in the involucre, which has a short campanulate tube, and a limb deeply bipartite, the segments wide, concave, at length divaricated, with thicker receptacles. His first species, *M. Meyenianum*, is a native of Manilla. The second, "doubtful" as to genus, is the *Hymen. Blumeanum* of *Spr.* and Blum. En. Fil. Jav. [omitted in our species], thus characterized; "frond pinnatifid or bipinnatifid brown glabrous, pinnæ alternate approximate cuneato-oblong pinnatifid, segments linear subbifid obtuse almost retuse, valves of the involucre subrhombeo-ovate obtuse, stipes terete. *Hym. pectinatum*, Nees et Bl. in Act. Nat. Cur. xi. t. 12, f. 5." Java, *Blume*, who observes that it comes very near *Hym. sanguinolentum*).

XIII. HEMIPHLEBIUM, *Pr.* Tab. IX. — H. pusillum, *Pr.* (Trich. *Sw.*)

Trib. II. HYMENOPHYLLOIDEÆ, *Pr.*

(This corresponds with *Hymenophyllum*, Sm. "*Involucre bifid, composed of 2 plates (laminæ), about equal in length with the receptacle.*"

XIV. LEPTOCIONIUM, *Br.* Tab. XI. D. — L. dicranotrichum, *Pr.* L.? fucoides, (Hymenophyllum, *Sw.*)

XV. MYRMECOSTYLUM, *Pr.* Tab. X. A. — M. tortuosum, *Pr.* (Trichom. *Banks, MS.* Hymenoph. *Hook. et Grev.*) M.? dichotomum, *Pr.* (Hymenophyllum, *Cav.*) M. clavatum, *Pr.* (Hymenoph. *Sw.*)

XVI. PTYCHOPHYLLUM, *Pr.* Tab. XI. E. — Pt. plicatum, *Pr.* (Hymen. *Kaulf.*)

XVII. HYMENOPHYLLUM, *Pr.* Tab. XI. A, B, C. Tab. XII. A, B. — § I. Sphærodium, *Pr.* H. Wilsoni, *Hook.* (H. Tunbridgense, *Schk. Fil. t.* 135, d.) H. Meyeri, [23] *Pr.* (H. Tunbridgense, b. *Drège*). H. antarcticum, (H. Tunbridgense, *Sieb. Syn. Fil.*) H. Menziesii,[24] *Pr.*

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[19] This is probably No. 2 of Mr. Cuming from Luzon, and if so it is our T. Filicula, *supra, p.* 124, with which species the author compares it.

[20] Probably united to our Tr. Filicula or Tr. humile, two species with which Presl compares it: from Luzon, *Cuming*.

[21] This, the n. 221 of Cuming's Philippine Island plants, is the same with Hymen. bivalve, *J. Sm.*, H. Smithii, *nob. supra, p.* 97.

[22] This I have no hesitation in referring to Tr. rigidum, *supra, p.* 133.

[23] The plant of Drège is referred to H. Wilsoni, *supra, p.* 96; and our author says of it, "valde affinis H. Wilsoni."

[24] This scarcely seems, from the description, different from H. Wilsoni,

§ II. Euhymenophyllum, *Pr.* A. Pilosa, *Pr.* H. valvatum, *Hook. et Grev.* H. blepharodes,[25] *Pr.* B. serrulata, *Pr.* a. *Evoluta*, Pr. H. minimum, *Less. et Rich.* H. Tunbridgense, *Sw.* H. asperulum, *Kze.* H. cupressiforme, *Labill.* H. Dregeanum,[26] *Pr.* (H. Tunbridgense, a. *Drège*). H. Peruvianum, *Hook. et Grev.* H. seselifolium.[27] *Pr.* H. multifidum, *Sw.* B. Dimidiata, *Pr.* H. unilaterale, *Bory.* H. Serra,[28] *Pr.* H. pectinatum, *Cav.* H. secundum, *Hook. et Grev.* C. Integra, *Pr.* H. asplenioides, *Sw.* H. fumarioides, *Bory.* H. Thunbergi, *Eckl.* (H. Tunbridgense, *Kze. partim*). H. flabellatum, *Labill.* H. nitens, *Br.* H. fraternum,[29] *Pr.* H. Poeppigianum,[30] *Pr.* (H. clavatum, *Kze.*) H. Jalappense, *Schlecht.* H. Grevilleanum, *Pr.* (H. polyanthos, *Hook. et Grev.*) H. polyanthos, *Sw.* (H. Millefolium, *Schlecht.* and *Mathews, Pl. Peruv. Exsicc. n.* 1790). H. emarginatum, *Sw.* H.? Javanicum, *Spr.* (H. crispum, *Nees et Bl.*) H. dædaleum, *Bl.* H. paniculiflorum,[31] *Pr.* — § III. Cycloglossum, *Pr.* H. cæspitosum, *Gaud.* H. Cumingii, [32] *Pr.* H. semibivalve, *Hook. et Grev.* H. decurrens, *Sw.* [*a. Jacquinianum*, fronds lanceolate, *Jacq. Coll.* ii. 2, *f.* 1, 2]. *β. Sieberianum*, fronds ovate. [Trich. clavatum, *Sieb.*] H. Kohautianum,[33] *Pr.* (Trich. clavatum, *Sieb.*) H. Schomburgkii, *Pr.* (Hymenoph. *Schomb. Pl. Gui. Exs. n.* 509. — § IV. Craspedophyllum, *Pr.* H. marginatum, *Hook. et Grev.*

XVIII. Sphærocionium.—Tab. IV. B. Tab. X. B, C.—I. Stellata, *Pr.*

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which is found in the adjacent island of Tierra del Fuego. H. Menziesii was gathered by Mr. Menzies in Staten Land.

[25] H. *blepharodes*, Pr. Hymen. p. 51; "frond oblong-lanceolate narrow acuminate pinnate, pinnæ opposite and alternate petiolulate lanceolate obtuse deeply pinnatifid, segments linear obtuse emarginate mucronato-serrulate, sori sessile ovate obtuse, segments of the involucre ciliato-serrate at the apex at length very patent longer than the receptacle, rachis winged above, below and the terete costa and stipes with simple or forked scattered hairs. Martinique, *Kohaut.*"

[26] This, the H. Tunbridgense, *a.* of Drège, I had considered to be a state of that species.

[27] May not this also be H. Wilsoni? From Chili (Chiloe?), *Cuming.*

[28] H. Wilsoni?

[29] H. *fraternum*, Pr. Hymen. p. 54. Tab. XII. B. sorus only. "Quite glabrous, frond oblong-lanceolate acute tripinnate, pinnæ petiolulate ovate obtuse, primary pinnules cuneato-lanceolate obtuse, secondary cuneate bifid, segments linear obtuse entire, rachis petiolules and apex of the stipes winged, sori sessile, segments of the involucre obtuse unequally and obtusely denticulate longer than the thickened receptacle. Jamaica."

[30] H. polyanthos, *β. nob. supra, p.* 107.

[31] This, being n. 214 of Cuming's Philippine Island plants, is by us referred also to H. polyanthos, *β.*

[32] Apparently Cuming's n. 13 and 15 from Chiloe, which I have referred to H. rarum, *supra, p.* 101.

[33] This is Sieber's Trich. clavatum, *Martin, n.* 250, and *Syn. Fil. n.* 141 partim, of which our author makes a species. "Hym. *Kohautianum*, Pr. Hymen. p. 56; very glabrous, frond linear-lanceolate acute bipinnate narrow at the base, pinnæ petiolulate alternate lanceolate obtuse, pinnules cuneato-lanceolate obtuse pinnatifid, segments linear emarginate and as well as the wings of the rachis entire, rachis and petiolules winged, stipes fili-

S. hirsutum, *Pr.* (Hym. *Sw.*) S. sericeum, *Pr.* (Hym. *Sw.*) S. tomentosum, *Pr.* (Hym. *Kze.*) S. interruptum, *Pr.* (Hym. *Kze.*) S. aureum,[34] *Pr.* S. Plumieri, *Pr.* (Hym. *Hook. et Grev. excl. Syn. Plum.* H. hirsutum, *Pr. in Rel. Hœnk.*) S. Sieberi,[35] *Pr.* (Trich. alatum, *Sieb.*) S. pulchellum, *Pr.* (Hym. *Schl.*) S. vestitum,[36] *Pr.* S. hirtellum, *Pr.* (Hym. *Sw.*) S. ciliatum, *Pr.* (Hymen. *Sw.*) S. Grevilleanum, *Pr.* (Hymen. ciliatum, *Hook. et Grev.*) S. lineare, *Pr.* (Hymen. *Sw.*) S. Boryanum, *Pr.* (Hymen. *Willd.*) S. commutatum, *Pr.* (Hymen. Boryanum, *Rad.*) S. elasticum, *Pr.* (Hymen. *Willd.*—Probably the *H. flavo-aureum*, Bory, in Belanger, Voy. with a very brief and imperfect character, may be referred hither). II. Pilosa, *Pr.* S. diversilobum,[37] *Pr.* S. Schiedeanum,[38] *Pr.* (Hymen. ciliatum, *Schlecht.*) S. trifidum, *Pr.* (Hymen. *Hook. et Grev.* This species, at p. 91, supra, under this name of H. elegans, ought to bear that of Hym. lineare, Sw. Syn. Fil. p. 147, and to have the station of "Jamaica, *Swartz*," added to it). S. pendulum, *Pr.* (Hymen. *Bory*, in Belang. Voy. Bot. p. 79, t. 8, f. 2. This is said to be from Bourbon; but the figure is so exact a representation of our H. elegans, supra, p. 114, H. lineare, Sw., that I do not see how the species is to be distinguished). S. cristatum, *Pr.* (Hymen. *Hook. et Grev.*) S. bivalve, *Pr.* (Hymen. *Sw.*) S. scabrum, *Pr.* (Hymen. *Less.*) III. Glabra, *Pr.* S. infortunatum, *Pr.* Hymen. *Bory*). S. australe, *Pr.* (Hymen. *Willd.*) S. ricciæfolium, *Pr.* (Hymen, *Bory*). S. rupestre, *Pr.* (Hymen, *Raddi*). S. caudiculatum, *Pr.* (Hymen. *Mart.*) S. productum,[39] *Pr.* S. dilatatum, *Pr.* (Hymen. *Sw.*) S. crispatum, *Pr.* (Hymen. *Hook. et Grev.*) S. macrocarpum,[40]

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form naked, sori half immersed, involucre bifid as far as the middle, segments obovato-orbicular entire as long as the receptacle. Martinique, *Kohaut.*"

[34] The Hym. sericeum of *Herb. Reg. Berol.* in my herbarium is undoubtedly the true H. sericeum.

[35] The specimens of Trich. alatum of *Sieb. Fl. Mart. Suppl. n.* 71, without fructification, in Dr. Presl's possession, are the authority for this species, which the author compares with his S. aureum and S. Plumieri.

[36] Filicula digitata, *Plum. Fil. p.* 73, *t.* 50, *f.* B, is an authority for this: and that is our Hymen. Plumieri, *supra*, *p.* 89.

[37] S. *diversilobum*, Pr. Hymen. p. 59; "frond glabrous linear-lanceolate acute at both extremities, below twice- above simply pinnated, pinnæ adnate the lower ones divided into three, the middle into two pinnules, the upper undivided and the pinnules linear emarginate denticulate, teeth ciliiferous, rachis and stipes winged denticulato-ciliate the hairs simple, sori half immersed, involucre bifid to the middle the segments orbicular ciliated. Antilles?"

[38] This is said to differ from Hym. ciliatum "præter alias notas pilis ciliisque simplicibus nec apice stellato-ramosis."

[39] Probably Mr. Cuming's plant from Chiloe, n. 4, which we have referred to H. caudiculatum, *Mart.*

[40] This, which is Cuming's "130," and according to Presl, from the Philippine Islands, stands in our herbarium as identical with H. caudiculatum, destitute of cauda if the fructification extends to the apex, caudate when the apex is barren. The station and number are by accident omitted at p. 102. I had feared indeed there was some error with regard to the station in my herbarium; but the number in Presl, and the same plant bearing the same number in Mr. Smith's herbarium, from Mr. Cuming's Philippine Island plants, confirms the locality, and the identity of the species.

Pr. S. badium, *Pr.* (Hymen. *Hook. et Grev.*) *Cuming*, *Pl. Philip. n.* 112). S. gracile, *Pr.* (Hymen. *Bory*). S. demissum, *Pr.* (Hymen. *Sw.*) S. sanguinolentum, *Pr.* (Hymen. *Sw.*) S. undulatum, *Pr.* (Hymen. *Sw.* H. fumarioides, *Kaulf. Kunze*). S. axillare, *Pr.* (Hymen. *Sw.*) S. abietinum, *Pr.* (Hymen. *Hook. et Grev.*)

XIX. HYMENOGLOSSUM, *Pr.*—H. cruentum, *Pr.* (Hymen. *Cav.*)

SUBORD. III. — DAVALLIEÆ.

Sori globose or more or less elongated, situated at the apex of a vein or veinlet, rarely on the back (below the apex). *Involucre* superficial, inserted at the base of the sorus and covering that sorus in the form of a scale, which is generally half cup-shaped more or less elongated, sometimes semicylindrical, rarely ovate, or orbicular, or reniform, always free at the apex sometimes also at the sides, but almost invariably fixed by a broad base, and at or near the margin of the fronds or segments of the fronds; varying much in texture, from membranaceous to coriaceous.—*Tufted or creeping* Ferns, *tropical or subtropical, rarely inhabiting temperate climates, and chiefly the Old World, frequently with a stout scaly horizontal caudex, of which the* Davallia Canariensis, *or* Hare's-foot Fern, *is an example; sometimes tufted.* Fronds *simple or pinnatifid or variously and compoundly divided, membranaceous or coriaceous.* Veins *simple or forked, not in any instance, that I am aware of, anastomosing.*

OBS. Many authors unite this group or Suborder of Ferns with *Dicksonieæ*, from which they appear to me to be well distinguished by the involucre not having its origin beneath and all round the sorus, so as to form a complete cup; but, originating from the lower base of the sorus, it forms a half-cup, the sides generally united with the frond, and free only at the apex: still it must be confessed that in some cases (as will be seen by our figures) when the sorus is at the narrow apex of a segment, that apex of the segment is so united with the margins of the involucre that it quite resembles the fructification of some *Dicksonieæ*, especially of a *Loxsoma*, or even a *Trichomanes*: and, if the sides are free, the resemblance then becomes great to *Lindsæa*. In other cases, when the involucre is nearly orbicular, or reniform, fixed by a more narrow base and free at the sides, and situated at a distance from the margin, the affinity is with some *Aspidiaceæ*, especially with *Nephrolepis* of Schott. No two authors are agreed as to the limits of this group, nor of the genera which compose it: and no wonder, seeing how gradually the genera seem to run one into another. To me the genera appear to have been needlessly multiplied, upon very insufficient grounds, so that in many cases I cannot even adopt them as subgenera.

1. DAVALLIA, *Sm.*

Davallia, *Sm.* (HOOK. GEN. FIL. XXVII). Wibelia, *Bernh.* Dicksoniæ sp. *Auct.* Microlepia, *Pr.*, *J. Sm.* (HOOK. GEN. FIL. TAB. LVIII. A.) Saccoloma, *Kaulf.* (HOOK. GEN. FIL. TAB. LVIII. B.) Aspidii sp. *Bl.* Stenolobus, *Pr.* Cibotii sp. *Pr.* Leucostegia, *Pr.*, *J. Sm.* (HOOK. GEN. FIL. TAB. LII. A.) Odontoloma, *J. Sm.* Humata, *Cav.* Nephrodii sp. *Gaudich.* Nephrolepidis sp. *Pr.* Prosaptia, *Pr.* Polypodii sp. *J. Sm.* Acrophorus, *Pr.*

Sori dorsal, near or at the margin of the frond or segments of the frond, terminal upon a vein or veinlet, globose or more or less elongated. *Involucre* orbicular, oval or elongated, often semicylindrical or half cup-shaped, attached to the under side of the sorus (and covering that organ) by a broad base, united or free at the sides, the apex free, open at the top towards the margin. *Capsules* stalked, the stalks very long in such species as have elongated involucres.—*Tropical or subtropical* Ferns, *rarely of temperate climates, chiefly of the Old World, varying much in size, and in the texture of the* fronds, *membranaceous or coriaceous, mostly stipitate.* Caudex *creeping, or none.* Veins *pinnated upon a central costa, simple or dichotomous.*

OBS. After a careful investigation of numerous species, I cannot but come to the conclusion that the original *Davallia* of Sir James E. Smith should remain entire as a genus, of which the type may be considered the well known *D. Canariensis.* It is quite true, if we look only to certain species of the many new genera that have been separated from it, such as of *Humata*, *Odontoloma*, *Saccoloma*, *Leucostegia*, &c., we shall find appareutly sufficient indications of generic difference: but if we take a comprehensive view of the respective species, we shall find that in point of generic marks they gradually pass one into the other, so that I cannot even satisfy myself of the efficiency of them as sectional characters or subgenera. It may be remarked, that Mr. J. Smith places many species in *Microlepia*, which Presl, its founder, never intended to refer to it. On the other hand, *Saccoloma*, as it stands in Presl, is made up of *Saccoloma*, Kaulf. and J. Sm., *Microlepiæ sp.* of J. Sm. and *Odontoloma*, J. Sm. *Humata* of Cavanilles and J. Sm. is included in *Davallia* by Presl, and I think correctly, when the different form of the involucre in some of the species is considered. *Prosaptia* of Presl, seems to me without sufficient reason removed to the *Gymnosoreæ*, and Mr. J. Smith goes further, and makes of it a *Polypodium.* I speak however only of *Prosaptia contigua*, *pinnatifida* and *Emersoni.* There is something so peculiar in the habit of the plant, and in the figure given by Presl, of *Prosaptia bipinnata*, that I do not know where it should be referred. *Leucostegia* of Presl (L. *immersa*), has a very peculiar appearance, and is well described by Presl. "Frondis — pagina superiore pallidiore faciem paginæ inferioris reliquarum Filicacearum præseferente, inferiore intensius viridi nitidiore faciem superiorem referente." This is very distinctly the case, and it is so in a less degree with some true *Daval-*

liæ (such as D. *solida* &c.) With this *Leucostegia* of Presl, Mr. J. Smith has combined the *Davalliæ, parvula, falcinella, chærophylla* &c. The venation is alike in all as to ramification, or at least there is no marked difference; the veins coming from a central costa are simple or forked: in some of the *Humata* group, and in one of the *Eudavalliæ*, they are peculiarly broad and dark-coloured.

Subgen. I. HUMATA, *Cav. Involucres orbicular or reniform, rigid, subindurated, the sides as well as the apices free. Caudex long, creeping, very scaly. Fronds small, coriaceous, entire or once or more pinnatifidly divided.* §§ Humata *and* Pachypleura, Colposoria, *Pr. in part.*

* *Fronds simple entire, or, the fertile only, sinuated.*

1. D. *heterophylla*, Sm.; caudex long creeping scaly and hispid with the long reflexed points of the scales, fronds coriaceous stipitate arising from a scaly bulb, sterile ones oblong- or ovato-lanceolate acuminate entire often waved, fertile ones linear-lanceolate acuminate deeply sinuato-pinnatifid the lobes horizontal crenate, involucres reniform copious on the crenatures of the lobes. — *Sm. Act. Taur.* v. *p.* 415. *Willd. Sp. Pl.* v. *p.* 465. *Sw. Syn. Fil. p.* 130, *and* 337. *Hook. et Grev. Ic. Fil. p.* 230. — Humata ophioglossa, " *Cav. Præl.* 1801, *n.* 678." — Davallia pinnatifida, *Sw. Syn. Fil. p.* 130. *Willd. Sp. Pl.* v. *p.* 465. Humata pinnatifida, " *Cav. Præl.* 1801, *n.* 679."—Davallia lobulosa, *Wall. Cat. n.* 241.

Hab. Malay Islands, probably general, (*Swartz, Smith*). Java, &c. *Blume, Zollinger, n.* 920. Penang, *Wallich.* Singapore, *Thos. Lobb.* Isle Samar, *Cuming, n.* 335.— An extremely beautiful species, with a very long, creeping stipes, densely clothed with imbricated scales and coarsely hispid from the long setaceous reflexed points of these scales. At different distances, and from a scaly bud or bulb, the fronds arise, solitary. Stipes ½ an inch to 2 inches long, naked, slightly winged upwards. Fronds 3—5 inches long, but varying a good deal in width, quite entire though sometimes waved at the margin. Fertile ones much narrower and longer, deeply sinuato-pinnatifid, with more distant and more divaricating veins: all the veins are, as it were, sunk and moderately slender, not very evident.

2. D. *angustata*, Wall.; caudex rather stout creeping densely paleaceo-setose, fronds coriaceous lanceolate arising from a scaly bulb entire or dentate acuminate, fertile ones generally much elongated obscurely sinuato-dentate, veins all parallel simple or forked thickened, involucres small transversely oval forming a single series along the margin.—*Wall. Cat. n.* 242. *Hook. et Grev. Ic. Fil. t.* 231.

Hab. Trunks of trees, Singapore, *Wallich, Cuming, n.* 367. Penang, *Lady Dalhousie.*—A small-growing Fern, with the habit of the preceding, but very distinct from it, especially in the broad flattened dark-coloured veins, quite parallel even in the fertile fronds, and in the smaller fructifications, which are all placed close to, and parallel with, the slightly crenated margin.

** *Fronds pinnatifid, the lower segments bipinnatifid, rarely pinnated.*

3. D. *parallela*, Wall.; caudex creeping paleaceous, fronds stipitate coriaceous ovato-lanceolate acuminate deeply pinnatifid nearly to the rachis, segments close parallel horizontally patent linear or linear-oblong subfalcate entire, the lowermost pair sometimes with a solitary obtuse lobe at the base beneath rarely more, involucres semiorbicular copious marginal but all pointing towards the apex of the segments in two close parallel lines (not pointing towards the margins), veins thickened sunk. (TAB. XLII. A.)— *Wall. Cat. n.* 251.—Nephrodium Gaimardianum, *Gaud. in Freyc. Voy. Bot. t.* 12, *f.* 1.— *β.* fronds and segments narrower, all even the lowest pair of segments destitute of lobe. Humata pectinata, *J. Sm. En. Fil. Philip. l. c. not Wall. and Hook.*

Hab. Singapore, *Wallich, Thos. Lobb.* Moluccas (Ravach) and Sandwich Islands, *Gaudichaud.*—*β.* Luzon, *Cuming, n.* 61.—A species undoubtedly nearly allied to the following (D. *pectinata*), but distinct. The shape of the frond is less deltoid, it is not so deeply divided; the segments closer and more parallel, and these are quite entire, except in the lowest pair, where there is generally a solitary lobe near the lower base of each. The fructifications are more copious and more compact, and the apex of the involucres points to the extremity of the segments not to the margin.

4. D. *pectinata*, Sm.; caudex creeping paleaceous, fronds stipitate coriaceous ovato-lanceolate subdeltoid deeply pinnatifid nearly to the rachis below pinnated, segments or pinnæ linear-oblong sub-lanceolate spreading crenate (rarely entire) the inferior ones pinnatifid the lowest pair unequally so the inferior lobes being the longest, involucres semiorbicular a little distant one on the tooth of each crenature obliquely inclined towards the margin.— *Sm. Act. Taur.* v. *p.* 414. *Sw. Syn. Fil. p.* 130. *Willd. Sp. Pl.* v. *p.* 465. *Hook. et Grev. Ic. Fil. t.* 139.

Hab. Otaheite, *Nelson (in Herb. Banks.), Menzies (in Herb. nostr.)* Society Islands, *Mathews, n.* 24. *Sir Thos. Nightingale.* Java, *Blume.* Island of Jobie, *Barclay.* Coral Islands, *Beechey.*— Sir Jas. Smith gives the East Indies as a locality, on the authority of *Mr. Hurlock;* but perhaps erroneously, for I have never seen it from the continent of India, only from the Pacific.

5. D. *alata*, Bl.; "frond linear-lanceolate pectinato-pinnatifid subpubescent beneath, segments linear obtuse entire with decurrent wings, sori marginal, stipes short winged and as well as the rachis subpubescent." *Blume, En. Fil. Jav. p.* 230.

Hab. Fissures of rocks, Java, *Blume.* "Very closely allied to D. *pectinata*, Sm., but different in the shorter laciniæ," *Bl.*— May it not be *D. parallela*, or a slight variety of it?

**** Fronds subternate and pinnatifid, or bi-tripinnatifid.*

6. D. *pedata*, Sw.; caudex creeping paleaceous, fronds stipitate very coriaceous small deltoideo-cordate somewhat 5-angled tripartito-pinnatifid, the segments patent but inclining upwards oblong obtuse, fertile ones crenato-dentate, the two lower primary divisions obliquely ovato-acuminate, involucres small semiorbicular or nearly orbicular alternating with the teeth of the serratures placed close to the margin and pointing to it, stipes elongated chaffy below. (TAB. XLV. A.) *Sm. Act. Taur.* v. *p.* 414. *Sw. Syn. Fil. p.* 131 *and* 341 (*excl. syn. Cav.?*) *Wall. Cat. n.* 250. D. cordifolia, *Reinw.* (*fid. J. Sm.*) D. subimbricata, *Bl. En. Fil. Jav. p.* 231 (*according to an authentic specimen in herb. J. Sm.*) Humata pedata, *J. Sm.* — Adiantum repens, *Linn. Suppl.* — β. minor, *Nees et Bl. Pl. Jav. in Act. Nat. Cur.* xi. *t.* 13, *f.* 1.

Hab. Mauritius, and Marianne Isles (*Swartz*), and Bourbon, *Wallich, Bojer, Carmichael.* Singapore and Sylhet, *Wallich.* Ceylon, abundant, *Mrs. Genl. Walker.* Java, *Blume.*—This varies in size from 2—6 inches, but scarcely in form, which appears to me very constant, the fertile specimens however being always the largest and the most divided.

7. D. *intermarginalis*, Bl.; "frond on a long stipes ovate deeply pinnatifid coriaceous glabrous, the segments linear-oblong obtuse crenated in the middle and at the apex, the lowest ones auricled below, involucres reniform intermarginal, stipes compressed glabrous, caudex creeping paleaceo-squamulose." *Bl. En. Fil. Jav. p.* 230.

Hab. Trees in the interior of Java, *Blume.* "Distinguished from the *D. pedata*, Sm., *D. subimbricata*, Bl. — see *D. pedata*, supra, — and *D. sessilifolia*, by the sori being within the margin (intermarginal), and not at the margin."

8. D. *sessilifolia*, Bl.; "frond subsessile cordato-oblong pinnatifid subcoriaceous glabrous, the segments oblong-linear obtuse crenulate soriferous at the apex all of them approximate, the lowest ones wider (not longer) subpinnatifid, sori reniform, caudex creeping ferrugineo-crinite." *Bl. En. Fil. Jav. p.* 231.

Hab. On trees, mountains of Salak, Java, *Blume.* "From the preceding species (*D. pedata*, &c.) this is distinguished by the frond being on a short stipes, by the ovato-oblong circumscription, almost membranaceous texture, and by the lowest segments being rather shorter than the rest, auriculato-pinnatifid at the lower margin."

9. D. *serrata*, Willd.; "fronds ternate, lobes pinnatifid, the segments of the sterile frond linear-oblong obtuse serrated, those of the fertile frond linear-lanceolate acute deeply serrated, caudex creeping." *Willd. Sp. Pl.* v. *p.* 467. — Humata trifoliata, *Cav. Præl.* 1801, *n.* 680.

Hab. Marianne Islands, (*Willdenow*). — From the more full description of Willdenow, as well as from the specific character, I suspect this is a mere state of *D. pedata*, and indeed his remark is "simillima præcedentis (*D. pedatæ*):" yet he puts it in a different section, "fronde ternata," to which the species has perhaps a better claim than to be placed in his first division "fronde sinuata v. pinnatifida." He quotes Cavanilles' *Humata trifoliata* under this species, which Swartz refers to *D. pedata*, and probably correctly.

10. D. *Belangeri*, Bory; caudex creeping chaffy, fronds deltoideo-ovate very coriaceous acuminate bipinnatifid tripinnatifid below glabrous and destitute of scales, primary segments oblong-lanceolate obtuse cuneate at the base lowest pair obliquely ovate the lower segments longest, ultimate ones subcuneate rather short obtuse crenate, stipes glabrous, fructifications small on the teeth of the crenatures, involucres nearly orbicular.—*Bory, in Belang. Voy. Bot. p.* 72, *t.* 7, *f.* 1.

Hab. Trunks of trees, Bintenzorg, Java, *Belanger*. Mergui, *n.* 461, *Mr. Griffith*.—Habit of *D. pedata*, but distinct, being twice or even thrice pinnatifid, the primary segments more numerous, more distant andmore divided.

11. D. *alpina*, Bl.; "frond stipitate 5-angled cordato-ovate pinnated coriaceous glabrous, pinnæ sessile linear-lanceolate inciso-serrate bearing sori at the incisures, lowest ones larger rhombeo-ovate deeply pinnatifid, segments serrated (serrulate in the sterile plant), involucres reniform, rachis margined and the stipes subpaleaceous, caudex creeping paleaceo-squamose." *Bl. En. Fil. Jav. p.* 231.

Hab. Summit of Mount Gede, Java, *Blume*. "Habitu similis *Davalliæ pedatæ*, Sm." — probably allied to, if not the same as, *D. Belangeri*. Blume places it among the pinnated species.

12. D. *Cumingii*, Hook.; caudex long creeping paleaceous, stipes elongated setoso-paleaceous, fronds coriaceous dimorphous, rachis and costa beneath with brown subulate scales, sterile ones very small cordate obtuse tripartito-pinnatifid the segments erecto-patent (5—10) the upper ones coadunate the two lowest ones obliquely ovate pinnatifid at the lower margin, all the segments obtuse serrated, fertile fronds larger cordato-ovate acuminate bipinnate the lowest pair with the inferior pinnæ pinnatifid the lower segments longest, all of them dentato-serrate, fructifications small in the sinuses of the teeth, involucres suborbicular. (Tab. XLV. B.)—Humata pedata, *J. Sm. En. Fil. Philipp. l. c.*

Hab. Isle of Samar, Philippine Islands, *Cuming*, *n.* 138. — The barren fronds of this have a good deal the appearance of *D. pedata*, but the fertile ones are extremely different, and in habit approach nearest to the following one, yet really distinct. They are, however, smaller, less compoundly divided, and the scales on the fronds are of a very different character.

13. D. *vestita*, Bl.; caudex creeping paleaceous, stipes elongated paleaceous with lanceolate chaffy scales, fronds coriaceous (a span or more high) bipinnate, pinnæ lanceolate subpetiolate pinnatifid the lowermost ones at the base again pinnate inferior segments the largest, all of them serrato-dentate, rachis and costa beneath beset with broadly ovate obtuse chaffy appressed subpeltate scales, fructifications small in the axils of the teeth, involucres suborbicular rather broader than long. (Tab. XLI. C.)—*Bl. in En. Fil. Jav. p.* 233.

Hab. Trunks of trees, mountains of Java, *Blume*, *Mr. Millett.*—This is quite distinct from any species with which I am acquainted, especially in the presence of copious rounded obtuse scales appressed to the under side of the frond upon the rachis and costa. The stipes is about a span long: the frond equally long, tripinnate below, the primary pinnæ numerous remote. Blume says of it, "*D. alpinæ*, nob. habitu similis, sed fronde majori bipinnata diversa;" and he indicates two varieties; "*var.* B; frond larger, lower pinnæ bipinnatifid, pinnules oblong-lanceolate rather obtuse, segments subinciso-serrate."—"*Var.* C. frond more slender, lowest pinnæ subbipinnatifid, pinnules (of the lowest pinnæ) only inciso-serrate." The latter inhabits Moluccas and the Celebes Islands. It is the former state apparently that we possess from Mr. Millett, and which we have here figured.

14. D. *bipinnatifida*, Bl.; "bipinnate (quinquangular ovato-oblong) coriaceous glabrous, lowest pinnæ bipinnatifid, pinnules lanceolate acuminate coarsely serrated, the segments (or secondary pinnæ) linear acute crenulate, crenules each with a single sorus, involucres subreniform, rachis margined, stipes terete glabrous, caudex creeping paleaceous." *Bl. En. Fil. Jav. n.* 234.

Hab. On trees in mountain woods of Java, *Blume*. "Priori (*D. vestitæ*) maxime affinis, pinnulis acuminatis et grosse serratis distincta." The author does not notice the numerous scales, which are so striking a feature in the preceding.

(D. *lepida*, Pr. Tent. Pterid. p. 128,—no description. Presl places it in the same section with *D. pedata*, and between *D. serrata*, Willd. and *D. pectinata*, Sm.)

Subgen. II. Leucostegia. *Involucres orbicular or reniform, thin, membranaceous and usually pale coloured, generally situated in the sinus of the teeth or segments, the sides as well as the apices free. Fronds small or ample, membranaceous, compoundly divided firstly in a pinnated manner, then pinnatifid. Caudex long creeping generally scaly.* Hook. Gen. Fil. Tab. LII. A. *Genus* Leucostegia, *Pr., J. Sm. (in part).*

15. D. *immersa*, Wall.; caudex creeping downy and fibrous with slender roots (not scaly), frond stipitate ovate in circumscription membranaceous opaque tripinnate, pinnæ pinnatifid

ovato-lanceolate, segments subovate or obovate obliquely cuneate at the base paler and slightly concave on the upper side, sori close to the margin, involucres large orbiculari-reniform close-pressed slightly convex. — *Wall. Cat. n.* 256. Leucostegia immersa, *Pr. Tent. Pterid. cum Ic. Hook. Gen. Fil. l. c.*

Hab. Northern India, Sheopore and Nepal, *Wallich.* Assam, *Mrs. Mack, Griffith, Major Jenkins.* Khasiya, *Griffith, Mr. Edgeworth.* — A very remarkable plant, apparently common in Northern India. The involucres are large and lie singularly close to the pagina of the segment, and on that side which is pale and slightly convex (from the curvature of the margin), peculiarities which characterize the anterior or upper side in most fronds: so that, as Presl well observes, unless you look carefully at the rachis and stipes, you would say that the fructification was on the superior side instead of the inferior. Stipes 4—6 or 7 inches high, sometimes a foot high. Frond about the same length.

16. D.? *nodosa*, Hook.; "frond tripinnate membranaceous furfuraceous on both sides of the veins, pinnules sessile (chaffy beneath at their insertions) oblong-lanceolate, secondary ones sessile oblong obtuse pinnatifid, segments cuneiform obtuse, lowest ones inciso-serrate or at the base again subauriculate, sori solitary submarginal, rachis nodose above at the insertion of the pinnæ and ferrugineo-tomentose, stipes slightly rough or glabrous paleaceous below." *Bl.* — Aspidium nodosum, *Bl. En. Fil. Jav. p.* 171. Acrophorus nodosus, *Pr. Tent. Pterid. p.* 93, *cum Ic.* — *Var.* B. frond very large decompound, the segments pinnatifid, *Bl. l. c.*

Hab. Woods of the lofty mountains of Java and Molucca, and *var.* B. summit of the mountains Gedę, Burangrang and Patuha in Java, *Blume.* — Of this plant, I regret to say, I know nothing, but from the remarks of Blume and Presl, and the figure of the latter author. Blume arranges it in *Aspidium*, and expresses no doubt of the propriety of so doing. Presl makes a distinct genus of it, and places it between *Cystopteris* and *Leucostegia*. Judging from his figure, I do not see how it differs from *Davallia*, but he says "hocce genus *Cystopteridi* valde affine est, differt soris in venulis apicalibus;" — and under *Leucostegia* he says, "*Acrophoro* affinissimum est." Mr. J. Smith does not appear to notice the genus. Link (in Fil. Spec. Hort. Reg. Berol. cult. p. 41) unites it with *Cystopteris*.

17. D. *chærophylla*, Wall.; caudex creeping stout clothed with compact imbricated very broad and obtuse scales, fronds rather small (1-2 feet) ovate acuminate membranaceous flaccid generally pale green 3- 4-pinnate, rachides winged, primary pinnæ oblong ovate acuminate, secondary and tertiary ones ovate obtuse, pinnules lanceolate deeply pinnatifid with linear-lanceolate falcate segments entire or with an inner tooth, involucres on the middle of the segment below the sinus of the tooth and at the axil of a pair of veinlets reniform

rather large, stipes a little scaly below and rising from a very scaly gemma, all the scales oval obtuse. (Tab. LI. A.)—*Wall. Cat. n.* 259. D. ligulata, *Wall. MSS. in Herb. Hook.* Leucostegia ligulata, *J. Sm.*

Hab. Northern India, Nepal, *Wallich.* Maamloo, Khasiya &c. *Griffith.* Masuri, *Mr. Edgeworth.* Simla, *Lady Dalhousie, (Fielding).* Assam, *Mrs. Mack, Major Jenkins.*— Caudex remarkable for the obtuse imbricated scales, which also extend to the stipes on the lower part. Stipes 6—8 inches high. Frond 1—2 feet, generally pale green.

18. D. *affinis*, Hook.; caudex creeping thick clothed with long narrow subulate scales, fronds ample tall ovato-lanceolate membranaceous 3- 4-pinnate or supradecompound, primary pinnæ petiolate ovato-lanceolate acuminate, secondary petiolate oblong-ovate, pinnules ovate deeply pinnatifid, the segments ovate acute subfalcate entire or generally (the fertile ones) with a tooth on the inner margin, involucres small hemispherical or subreniform placed near the centre of a segment below the sinus of the tooth, (veins slender black). (Tab. LII. B.) Leucostegia affinis, *J. Sm. En. Fil. Philipp. l. c. (name only).*

Hab. Luzon, *Cuming, n.* 215, and *n.* 117. Ceylon, *Mrs. Genl. Walker*, apparently abundant. Penang, *Lady Dalhousie.* Java, *Mr. Millett.*—An extremely handsome species, with more ample fronds (2—3 feet high), and more copiously divided than the preceding, of a very membranous but rather firm texture, darker colour, and with a slender black vein in the segments. Probably in naming this *Leucostegia affinis*, Mr. J. Smith had in mind our *Davallia chærophylla*, Wall., which is its nearest affinity, but besides the differences just mentioned, the scales of the caudex and of the lower part of the stipes are of a totally different character,

19. D. *Novæ Zelandiæ*, Col.; caudex creeping slender hairy as the lower part of the caudex and the axils of the primary pinnæ with soft copious jointed ferruginous hairs, fronds rather tall ovate acuminate tripinnate membranaceous but rather rigid, divisions all rather distant, ultimate pinnules lanceolate deeply pinnatifid, pinnules ovato-lanceolate falcate cuspidato-acute entire or with one or two teeth, fructifications rather large upon the lateral tooth rarely in a sinus, involucres subreniform at length reflexed from the enlargement of the sorus, rachis flexuose. (Tab. LI. B.)—*Colenso in Tasm. Journ. of Nat. Sc.* — *Hook. Fil. in Lond. Journ. of Bot.* iii. *p.* 418. D. hispida, *Hew. MSS.*

Hab. New Zealand, northern island, *A. Cunningham, in Herb. Heward. n.* 214. Both upon the coast and in the interior, *Mr. Colenso, n.* 56, *Stephenson, n.* 121. — Quite distinct from any other *Davallia*, but allied to *D. chærophylla*, Wall. and to the preceding, *D. affinis*, J. Sm., in size most resembling the former one. Caudex slender, creeping, hairy or almost to-

mentose with jointed soft ferruginous hairs, not at all scaly, sending down numerous hairy fibrous roots from the base. Stipes 6—8 inches high, mahogany brown, shining: main rachis the same, flexuose and slender. Frond 8 inches to a foot long, membranaceous, but very firm, thrice pinnated. Sori large in proportion to the segments, often equal in breadth to the segments on which they are placed. The colour of the frond is brownish green, slightly glossy, much paler below. Mr. Heward has given a very appropriate name to the species in his herbarium, which we would gladly adopt, but that Mr. Colenso's name is sent to us as published in the 'Tasmanian Journal of Science' in a number probably which has not yet reached this country.

20. D. *membranulosa*, Wall.; caudex hispid with very long slender subulate rigid membranaceous scales, frond small very thin and membranaceous ovato-lanceolate and as well as the slender stipes and rachis pubescenti-hirsute bipinnate, pinnæ alternate lanceolate their rachis winged, pinnules lanceolate pinnatifid, the segments ovato-lanceolate subfalcate very acute entire or rarely toothed, involucres small ovato-subrotund acute very thin and membranaceous fixed by the broad base the rest free. (Tab. LIII. A.) *Wall. Cat. n.* 255.

Hab. Nepal, *Wallich.*—A small and very delicate species, with the habit of *Cystopteris*, but the sorus is at the apex of a vein, although the involucres are more sharp-pointed than is usual with *Davallia*. Caudex with long ferruginous narrow subulate scales. Stipes 2—3 inches high, and, as well as the rachis, which is winged above, very slender, almost filiform. Frond a span long. Primary pinnæ 2 inches long, lanceolate, of a red-brown colour.

21. D. *falcinella*, Pr.; caudex creeping rather thick branched densely covered with spreading very long subulato-setaceous scales paler at the apices of the caudex, frond deltoideo-cordate sub-membranaceous 4-pinnatifid (rachis everywhere winged), ultimate pinnules oblong pinnatifid, segments lanceolate subfalcate acute entire, in the fertile specimens bidentate the teeth unequal spreading, the sorus occupying the sinus between two veins but not reaching to the margin, involucre large in proportion to the size of the segments nearly orbicular flat truncated at the apex, rachis not winged. — *Presl, Reliq. Hænk.* i. *p.* 66, *t.* 11, *f.* 2. Leucostegia, *J. Sm.*

Hab. Malay Islands, Sorzogon (*Presl*). Leyte, *Cuming*, *n.* 304. — A small elegant species, with a singularly crinite caudex and a small frond (4—5 inches long), which exhibits a considerably different appearance in the fertile and in the sterile state: in the former the ultimate laciniæ dividing into two unequal spreading slightly incurved teeth, between which, at a little distance from the margin, the large flat involucre is inserted. This involucre is scarcely fixed by a sufficiently narrow base to justify the species being placed in this division, yet the habit of the plant and the flat (not convex or semiterete) involucres, seem rather to point out its affinity to be with the present.

22. D. *parvula*, Wall.; caudex long creeping clothed with lax subulate scales, frond very small deltoid tripinnatifid glabrous rigid (from the stout costæ), segments linear throughout slightly grooved above when dry unequally forked and acute at the apices, sori at the sinus of the forks, involucres suborbicular dilated above and broader than the segments.—*Wall. Cat. n.* 247. *Hook. et Grev. Ic. Fil. f.* 138. Leucostegia, *J. Sm.*

Hab. Singapore, *Dr. Wallich*, 1822. — I am not aware that this beautiful little fern, of which the fronds are scarcely more than an inch long, and the stipes about the same length, has been detected by any one except Dr. Wallich, and by him only in the island of Singapore. It there forms large tufts with its long interlaced creeping caudices, bearing numerous fronds which arise pretty close together, but from different distances. The rigidity of the frond seems due to the wide and stout costæ, and the very small quantity of foliaceous substance, which merely forms a sometimes scarcely perceptible narrow wing.

23. D. *pulchra*, Don; "frond ovate pinnate glabrous, leaflets deeply pinnated, segments inciso-lobate, lobes linear-lanceolate acute, sori solitary, involucres scariose, stipes and rachis very glabrous." *Don, Prodr. Fl. Nep. p.* 11. Leucostegia, *J. Sm.*

Hab. Nepaul, *Wallich*. "Fronds very elegant, a foot high or more, slender, full green, finely cut."—This is in all probability some one of Dr. Wallich's species elsewhere mentioned; but, with such a meagre description, and no figure, I am unable to refer it to its proper place.

Subgen. III. PROSAPTIA. *Sori marginal, terminal upon a segment or lobule of the frond. Involucre cuneato-semiterete, truncate and opening at the apex: its texture that of the frond, of which it appears to be formed. — Tufted rather small Ferns, natives of the Malay Archipelago, Ceylon, and the Pacific Islands. Fronds almost sessile, erect, simple, pinnatifid or subpinnatifid, coriaceous, more or less hairy or glabrous, very opaque, with sunken obscure pinnated veins, terminating within the margin and clavate at the apex. — Genus* Prosaptia *among* Gymnosoreæ, *Pr.* Polypodium, *J. Sm.*

OBS. I feel unwilling to multiply genera unnecessarily, and retain this group among the *Davalliæ;* though I think, on account of its habit, rather than from any important character in the fructification, it deserves to constitute a genus better than any other other group of *Davalliæ*. But I cannot agree with Presl, who places it among his "*Gymnosoreæ;*" still less with Mr. J. Smith, who unites it to *Polypodium*. — I have never seen the *Prosaptia bipinnata* Presl; but judging from the figure (for there is no description) it ought not to be referred hither, though I know not where else to place it. Its involucres are represented as a truncated cone, open at the summit and projecting forward from the margin of the pinnæ beneath. The habit is more that of the pinnated section of our subgenus "*Microlepia*."

24. D. *Emersoni*, Hook. et Grev.; tufted, fronds aggregate sessile lanceolate pinnatifid from the margin half-way down to the costa attenuated and entire at the apex, the lobes oblong obtuse entire bearing 1—6 sori at the apices. *Hook. et Grev. Ic. Fil. t.* 105.—*β. minor;* smaller, segments rarely bearing more than one sorus. D. serræformis, *Wall. Cat. n.* 249. *Hook. Ic. Pl. t.* 93. Polypodium serræforme, *J. Sm.* Prosaptia, *Pr.*

Hab. Ceylon, *Dr. Emerson, Mrs. Genl. Walker.* — *β.* Penang, *Dr. Wallich, Lady Dalhousie.* Luzon, *Cuming, n.* 261. — Varying in height from 6 inches to a foot.

25. D. *contigua*, Sw.; tufted or with a very short somewhat creeping caudex, fronds aggregate lanceolate attenuate at both extremities on a short stipes pinnatifid throughout from the margin almost to the costa glabrous, segments linear entire or subpinnatifid with one or more lobules towards the extremity, sori solitary terminal upon a segment or lobule.—*Sw. Syn. Fil. p.* 130. *Willd. Sp. Pl.* v. *p.* 465. *Bl. En. Fil. Jav. p.* 230. *Hook. et. Grev. Ic. Fil. t.* 141. Prosaptia, *Pr.* Polypodium, *J. Sm.* Trichomanes contiguum, *Forst. Prodr. n.* 463, (*et in Herb. Banks.*)

Hab. Pacific Isles, Huaheine? *Forster.* Otaheite, *D. Nelson.* Java, *Dr. Horsfield, Blume.* Ceylon, *Dr. Emerson, Mrs. Gen. Walker,* Philippine Islands, *Cuming, n.* 216.— Habit of the preceding, but more deeply divided, even to the very apex, the segments much narrower, with a great disposition to be again pinnatifid, and bearing only one terminal sorus upon each segment or lobule.

26. D. *Preslii*, Hook.; frond pinnatifid nearly to the costa hairy as well as the involucres. Prosaptia pinnatifida, *Pr. Tent. Pterid. p.* 166 *(name only), t.* 6, *n.* 25, *(not* Davallia pinnatifida, *Sm.)* Davallia pectinata, *Meyen, Herb.*(*not Sm.*)

Hab. Luzon, (*Presl*). — I have drawn up the above brief character from Presl's figure, in the absence of any description. It would seem to be a hairy state of *D. contigua.*

Dubious Species of this Subgenus.

27. D.? *bipinnata*, Hook.; frond bipinnate, pinnæ broad half ovate truncate at the base above, involucres standing forward from the margin beneath. Prosaptia, *Pr. Tent. Pterid. p.* 166, (*name only*), *tab.* 6, *f.* 19.

Hab. West Indies, (*Presl*). — The native country of this plant, no less than the different habit and peculiar fructification (as far as can be learned from the figure), would lead to the opinion that it is far removed from *Prosaptia.*

Subgen. IV. EUDAVALLIA. *Sori marginal or nearly so, frequently in a sinus of the segments or terminal upon the segments.*

Involucres elongated more or less, between membranous and coriaceous, approaching to semicylindrical, urceolate or cuneate, the sides as well as the base confluent with the frond, the apex only free and usually truncated.—Chiefly E. Indian and Malayan Ferns. *Caudex long, creeping, stout, scaly. Fronds coriaceous, frequently ample, ternati-pinnate or compoundly pinnate, the pinnæ more or less pinnatifid, the segments generally more or less attenuated (not dilated upwards).* Hook. Gen. Fil. tab. 27. Davallia, *J. Sm. in part.* Stenolobus, *Pr. and* Davallia, § 3. Colposoria, *in part, and* § 4. Odontosoria, *in part, Pr.*

Obs. This group has its representative in *D. Canariensis*, Sm., which I consider to be the type of that author's genus *Davallia*. It is a natural assemblage, including species of great beauty; mostly bearing ample, coriaceous, glossy fronds, with coriaceous involucres, which in general may be described as half tubular, the sides as well as the base being incorporated with the frond, and in that respect approaching the previous subgenus, *Prosaptia*; but differing from it in habit and in the texture of the involucre and in the presence of the long scaly creeping caudex. Some of the present group, with the most elongated involucres, Professor Presl has distinguished as a genus, by the name of *Stenolobus*, and, misled, perhaps, by Schkuhr's figure of *D. solida* (the type of this genus), he has described the stalks of the capsules as arising from a slender filiform receptacle, which as Mr. J. Smith has justly observed, is by no means the case: and the species of the genus in question have nothing to distinguish them even as a section from these true *Davalliæ*. Mr. J. Smith, on the other hand, has united with them the species of the section "*Odontosoria*" of Presl, which, as it appears, are fully entitled by character and habit to be kept separate from them. The difficulty of discriminating several of the species of this group, it must be confessed, is very great; for the pinnæ, or segments, often vary much in form in different parts of the same plant; and even figures are scarcely sufficiently characteristic, except they are upon a large scale.

* *Fronds small, ternate or quinate.*

28. D. *triphylla*, Hook.; caudex stout creeping covered with chaffy scales, fronds coriaceous small ternate, pinnæ oblong-lanceolate obtuse cuneate at the base in fertile plants more elongated all of them entire, intermediate ones petiolate, lateral ones shorter sessile oblique at the base, veins horizontally patent copious crowded parallel forked thickened flat (not prominent), involucres semicylindrical compressed crowded so as to form an uninterrupted marginal line the whole length of the pinnæ. (Tab. XLVI. A.)— Stenolobus pentaphyllus, *J. Sm. En. Fil. Philipp. l. c.* (*not* Davallia pentaphylla, *Bl.*)

Hab. Sincapore, *Cuming, n.* 366. — A beautiful species, which is certainly distinct from the *D. pentaphylla* of Blume, to which Mr. J. Smith had referred it; for that has a quinate or rather quinato-pinnate frond, with the sterile frond distinctly serrated: whereas our plant has not, so far as I have seen, more than three pinnæ, and the sterile fronds equally entire with

the fertile ones, differing from each other indeed only in the shorter and broader pinnæ of the sterile individuals.— Caudex with closely imbricated paleaceous scales, having long wiry points. Stipes 3—4 inches long, terminal pinna 4-5 inches long.

29. D. *pentaphylla*, Bl.; frond ternate or quinato-pinnate coriaceous quite glabrous, pinnæ lanceolate cuneate at the base unequally serrated, fertile ones (ternate) narrower elongated, sori oblong truncated marginal, stipes glabrous, caudex creeping. *Bl. En. Fil. Jav. p.* 232.

Hab. Woods of Java, Province of Bantam, Tjanjor, &c. *Blume.* — An equally elegant species with the preceding, and very distinct from it.

** *Fronds decompoundly divided.*

30. D. *solida*, Sw.; tall, caudex stout creeping clothed with densely imbricated scales, fronds coriaceous tri- subquadripinnate, pinnæ acuminate, pinnules trapeziform acuminate pinnatifid many-veined, terminal ones crenato-serrate coadunate into an acuminated point, involucres linear-oblong sunk in a tooth or segment having a narrow wing on each side or entire. — *Sw. Syn. Fil. p.* 132 *and* 345. *Willd. Sp. Pl.* v. *p.* 470. *Schkh. Fil. t.* 126. "D. procera, *Hedw. Fil. Fasc.* iv. *tab.* (*in descr.* elegans") *fide Sw.*—*β. latifolia;* pinnules wider, the soriferous segments entire (without terminal teeth). (Tab. XLII. B.) D. ornata, *Wall. Cat. n.* 246. Stenolobus ornatus, *Pr.* (*name only*). — *γ. caudata;* pinnæ narrower, apices of the pinnules long caudate, involucres with a small incurved terminal tooth on one or both sides, sometimes entire. D. caudata, *Wall. Cat. n.* 2220, *an Sw.?* Stenolobus Kunzeanus, *Pr. Tent. Pterid. p.* 130, *t.* 4, *f.* 30, (*name and figure only*). "D. elegans, *Kze. herb. nec Swartz,*" (*Pr.*) D. solida, B. lacera, *Bl. En. Fil. Jav. p.* 234. Trichomanes solidum, *Forster, Prodr. n.* 475.

Hab. Pacific Islands, *Forster.* Otaheite, *Menzies, Nightingale.* New Ireland, *Barclay.* Pitcairn's Island, *Mathews.* Malden Island, *Macrae.* Java, *Millett, Blume.* — *β.* Penang, *Wallich, Lady Dalhousie.* Singapore, *Wallich.* Luzon, *Cuming, n.* 78.— *γ.* Sincapore, *Wallich.* Island of Vanicoro, (*Presl*). Java, *Blume.* — A very variable plant, as it appears to me, of which the figure of Schkuhr exhibits, perhaps, the more usual form: our plate on the other hand the larger state; while our var. *γ.* to which I think *Stenolobus Kunzeanus*, Pr. may be referred, represents the opposite extreme. In this, and several others of the present section, the broad pinnules exhibit a rather close and copious venation, but there is an entire absence of the striæ or pseudo-veins, by which, and by the longer involucres, the present species is distinguished from *D. elegans.*

31. D. *Lindleyi*, Hook.; caudex creeping short thick densely clothed with subulate ciliated scales, fronds small coriaceous glabrous bi-tripinnate deltoideo-ovate on a long

stipes, pinnæ pinnatifid ultimate ones and segments lanceolate (sterile ones broad) pinnatifid, lobules short truncate soriferous almost wholly occupied by the somewhat half-cup-shaped or urceolate truncated involucres. (TAB. LVIII. B.)

Hab. New Zealand, (*Dr. Lindley*).—A small plant, not in a very perfect state, the fructified frond being young, resembling *D. solida* in miniature, especially in the structure of the sterile frond: but the sori are very different, and more like those of *D. pyxidata*, being short and as it were sunk in the truncated lobule, which has a very slight external margin or wing, formed of the frond itself. Stipes of the sterile frond 5 inches high; frond 3 inches: of the fertile one a span high; its frond 4 inches. I possess a larger specimen, given me by the late Mr. Lambert, and marked as from Jamaica, but probably by mistake. It seems to be identical with this from New Zealand.

32. D. *caudata*, Cav.; "fronds decompound, leaflets lato-lanceolate. subbipinnatifid attenuated at the apex, pinnæ acuminate somewhat eared at the base above, crenatures obtuse." *Cav. Præl.* 1801, *n.* 694. *Sw. Syn. Fil. p.* 132. *Willd. Sp. Pl.* v. *p.* 472.

Hab. Philippine Islands (*Swartz*).—This I do not know; but it may probably be a variety of *D. solida*, than which Swartz says it is "larger, with the leaflets nearly opposite broadly lanceolate subfalcate pinnated, ending in an elongated apex: the pinnæ trapezio-lanceolate acuminate an inch and a half long; lower ones incised subpinnatifid; superior ones undivided, all obtusely serrated at the margin. Fructifications inserted at the serratures, oblong, obtuse."

33. D. *Mauritiana*, Hook.; caudex very stout creeping densely woolly with long subulate ciliated and hairy scales, fronds ample deltoid between coriaceous and membranaceous 4-pinnate, pinnæ caudato-acuminate, pinnules ovate acuminate deeply pinnatifid, segments lanceolate or linear slightly patent laciniated or again pinnatifid, laciniæ linear narrow terminated by an involucre which in conjunction with the apex of the lacinia is nearly cylindrical compressed narrower upwards truncated and contracted at the mouth rarely a little winged at the very base. (TAB. LV. B.)

Hab. Mauritius, *Carmichael*, *Bojer*. — Most nearly allied to *D. solida*, but much less coriaceous, with narrower more elongated and more deeply divided segments, which are a little contracted where the involucres are set on: and the apex of the segment which bears the involucre is slightly changed in colour, and being no wider than the involucre, it assumes the appearance of the free cylindrical involucre of a *Trichomanes* or a *Loxsoma*.

34. D. *elegans*, Sw.; caudex stout creeping scaly and woolly, fronds tall subcoriaceous ovato-acuminate tri-quadripinnate, pinnules lanceolate pinnatifid acuminate striated with pseudo-veins between the true veins, ultimate pinnules lobato-crenate, lobules entire or more usually one- or two-toothed,

involucres half cup-shaped a little elongated sunk inserted upon the lobe compressed truncate at the mouth.—*Sw. Syn. Fil. p.* 132, *and p.* 347. *Willd. Sp. Pl.* v. *p.* 471. *Wall. Cat. n.* 253. — *α. bidentata;* glossy, pinnæ acuminate, fertile lobules with 2 unequal incurved teeth one on each side of the sorus. D. bidentata, *Schkh. Fil. t.* 127.—*β. pulchra;* fronds very coriaceous green when dry, pinnæ much acuminated, pinnules blunt, fertile lobules truncate or rarely with 2 short erect teeth. (Tab. XLIII. A.) — *γ. subunidentata;* opaque, segments moderately acuminate, lobules truncate with one short tooth or rarely two and then unequal. (Tab. XLIII. B.) — *δ. coniifolia;* similar to the last, but the segments narrower, and more deeply cut. D. coniifolia, *Wall. Cat. n.* 252. — *ε. edentula;* similar to the last, but fertile lobules without teeth.—*ζ.* same as the last, but with 2 short diverging teeth on the fertile lobules.

Hab. *α.* China, Canton, *Swartz.* Tranquebar, Java, (*Willdenow*). Madras Peninsula, *Heyne, Dr. Wight.* Penang, *Wallich.* East coast of tropical New Holland, *Brown, A. Cunningham.* Madagascar, *Dr. Lyall, Bojer.*—*β.* Sincapore, *Thos. Lobb.* Otaheite, *Menzies.* China, *Beechey.*—*γ.* Java, *Zollinger, n.* 147.—*δ.* Rangoon, *Wallich.*—*ε.* Mergui, *Griffith, n.* 67.—*ζ.* Ceylon, *Mrs. Gen. Walker.*—Apparently a very general plant in the East Indies, both on the Continent and Islands, and in Tropical New Holland. Remarkable for the elegant divisions of its fronds, and for the dark-coloured lines upon the segments, giving them a striated appearance, but which can hardly be called true veins, for they are often not visible when the frond is held up between the eye and the light, although the real veins then become more apparent. I regret that this striated appearance is omitted (nor is it easy to represent it in a figure) both in the plate of Schkuhr, and in the outline sketches here given: but something of the kind is shown upon our *D. elata*, Tab. LV. A.

35. D. *nitidula*, Kze.; "frond triangular subcoriaceous nearly glabrous paler beneath subtripartite tripinnate, pinnæ alternate petiolate patent ovate acuminate slightly curved lowest ones more remote nearly opposite, secondary pinnules from a cuneate base unequally ovate obtuse pinnatifid or incised, segments cuneato-oblong retuse or subemarginate at the apex subincised bearing sori, involucres obovate truncated, rachis and moderately long stipes flexuose glabrous, caudex creeping chaffy." *Kze.* (Tab. XLIV. A.)—*Kze. Fil. Austr. t.* 37, *in Linnæa*, x. *p.* 545, *and in Schkh. Fil. Suppl. Afr. f.* 2.

Hab. South Africa, *Drège.*—Kunze's representation of this plant is excellent, and I would not have published my present figure (admirably as it represents a portion of the plant), but that it was prepared before I was acquainted with Kunze's plate. The affinity of the species is surely with *D. elegans*, I think rather than with *D. elata*, as the accurate Kunze intimates. It differs however from our last species in the absence of striæ.

36. D. *elata*, Sw.; caudex ——? fronds 3-4-pinnate subcoriaceous glabrous, pinnæ attenuato-caudate, ultimate pinnules or segments ovato-lanceolate sub-obtuse pinnatifid striated, segments inciso-serrate lower ones again pinnatifid, sori in the axils of the serratures (*i. e.* with a tooth on the outside) rather small upper half (or nearly so) free attenuated forming a lip. (Tab. LV. A.)—*Sw. Syn. Fil. p.* 131 *and* 344. *Schkuhr, Fil.* i. 127, b. *Willd. Sp. Pl.* v. *p.* 472. Wibelia elata, *Bernh. in Schrad. Journ.* 1801, *p.* 122, *t.* 1, *f.* 2. Trichomanes elatum, *Forst. Prodr. n.* 474. Davallia epiphylla, *Forst. Prodr. n.* 471. *Sw. Syn. Fil. p.* 134 *and* 352. *Willd. Sp. Pl.* v. 473. *Schkuhr, Fil. t.* 127, b. Trichomanes epiphyllum, *Forst. Prodr. n.* 471. Wibelia multifida, *Bernh. in Schrad. Journ. l. c. f.* c, a, b.

Hab. Otaheite, *Forster*, *Menzies*. Western Java, *Blume*. — In habit closely allied to *D. elegans*, and like it striated or marked with lines or pseudo-veins between the veins: but the involucres are very different, and well defined both by Bernhardi, who made a genus of it, and by Swartz: still none of the figures of Bernhardi or of Schkuhr represent the true form of the involucre. An examination of the Banksian herbarium has satisfied me that the *Trichomanes elatum* and *T. epiphyllum* are one and the same species of *Davallia*.

37. D. *Fejeensis*, Hook.; caudex ——? frond coriaceous, as it would appear decompoundly pinnate, pinnæ lanceolate acuminate deeply pinnatifid the segments erecto-patent almost appressed narrow linear simple or bifid, involucres linear sunk in the apices of the narrow elongated segments so as to have a narrow wing on each side (no teeth). (Tab. LV. D.)

Hab. Nukalau island of the Fejee group, *Barclay*. — I have only seen a small specimen (about thrice the size of the figure, tab. LV. D.) which is in my own herbarium, and a still smaller one in that of Mr. J. Smith, yet I cannot but look upon it as quite distinct from any other of this genus. It is many times compound, the principal pinnæ much—almost caudato—acuminate, and all of them pinnatifid, with the long narrow segments pointing upwards (erecto-appressed), and sometimes a little dilated towards the apex, so that they may be said to be linear-clavate; yet not sufficiently to justify the species being placed in the group of "*Odontosori*," from all of which the sori will at once distinguish it: they are among the longest and narrowest of the genus. Probably the *D. epiphylla* of Blume is different, for he says "tenuitate frondis ac serraturis quasi spinescentibus, facile a *Davallia elata*, Sw. distinguitur."

38. D. *patens*, Sw.; "fronds ample triplicato-pinnate glabrous, pinnæ and pinnules subalternate rather remote ovato-oblong very acuminate, secondary ones below pinnatifid, segments rather remote cuneato-linear obtuse serrulate, serratures bearing the sorus exserted bidentate (between the

nearly erect teeth monosorous), stipes and rachis glabrous." *Bl.—Sw. Syn. Fil. p.* 132. *Willd. Sp. Pl.* v. *p.* 475. *Bl. En. Fil. Jav. p.* 256.—*Var.* B. frond more membranaceous (tenuiore), the segments of the pinnules narrower on the lower margin not unfrequently entire. *Bl. l. c.*

Hab. East Indies, *Swartz.* Trees and rocks in shady and moist places, western Java.—β. Moluccas, *Blume.*—With this I am unacquainted. Blume remarks that "its nearest affinity is with *D. elata*, from which it differs in the frond being more spreading, more rigid, in the secondary pinnules being much elongated towards the extremity, and in the segments of the pinnules being narrower and simply serrulate."

39. D. *divaricata*, Bl. (non Schlecht.); "frond ample triplicato-pinnate glabrous, pinnæ and pinnules subalternate remote ovato-oblong very much acuminated, secondary ones pinnatifid, segments subfalcato-linear subinciso-serrate, serratures bearing sori in the middle, stipes and rachis glabrous, caudex paleaceous." *Bl. En. Fil. Jav. p.* 237.—*Var.* B. more slender in every part, secondary pinnules pinnatifid only below, the rest coarsely inciso-serrate. *Bl. l. c.*

Hab. Mountain woods of Java, *Blume.* "From *D. elata*, to which it approaches very near, it differs in the large and very patent frond, in the narrower and more distant segments, and in the sori being remote from the margin of the incisures, not inserted upon the teeth." *Bl.*

40. D. *mucronata*, Bl.; "frond bipinnate and as well as the trigonous stipes glabrous ferruginous, pinnæ alternate ovato-oblong caudate, lower ones pinnatifid, pinnules pinnatifid mucronate, secondary ones linear rather acute unequally serrulate, serratures incurved bearing sori in the middle, sori subrotund." *Bl. En. Fil. Jav. p.* 235.

Hab. Lofty mountains of Java, *Blume.*—Blume places this next to *D. elegans*, and observes that *D. caudata*, Cav. seems to differ in the pinnules or segments being crenated.

41. D. *decurrens*, Hook.; caudex ——? frond ample coriaceo-membranaceous 3- 4-pinnate, pinnæ distant lanceolate acuminate lower pinnules pinnatifid petiolate upper ones and the segments of the pinnules oblong rather acute decurrent so as to form a winged rachis, the segments serrated, each lobule bearing an oval truncated involucre below the apex in the sinus, having a short blunt tooth on the outside (veins pinnated, no striæ). (TAB. XLIV, B.)—D. alata, *J. Sm. En. Fil. l. c. name only* (*not Bl.*)

Hab. Isle of Bohol, Philippine Islands, *Cuming.*—Mr. J. Smith had given a very appropriate name to this plant, but which is not tenable, being previously taken up by Blume for another species. The present is very distinct: the pinnæ are below pinnated, but the superior pinnules or segments, though distant by the decurrent bases, which give a winged

character to the rachis. There are no striæ or pseudo-veins, as in *D. elegans* and *D. elata*, and the involucres are inserted below the apex of the teeth or lobules.

42. D. *polyantha*, Hook.; tall coriaceous, frond 3- 4-pinnate, pinnæ distant ovato-lanceolate acuminate, lower pinnules deeply pinnatifid almost to the rachis petiolate, upper ones and the segments of the pinnules oblong rather acute, ultimate ones decurrent so as to form a winged rachis, all of them crenato-serrate, veins pinnated no striæ, each lobule bearing an oval truncated involucre rather considerably below the apex with a very short erect tooth on the outside (often obsolete). (Tab. LIX. A.)

Hab. Sincapore, *Thos. Lobb.* — I was at first disposed to refer this to the *D. decurrens*, just described (*D. alata*, J. Sm. not Bl.), but I feel satisfied that it is different. It is of a more rigid and coriaceous texture, more glossy; the winged rachis is only confined to the upper segments; the lower segments are more deeply pinnatifid, and the involucres (which are copious in both) are a little different in form, and more distant from the margin.

43. D. *Vogelii*, Hook.; caudex long creeping stout densely clothed with shaggy hair-like subulate fimbriated scales, frond rather small deltoid-ovate submembranaceous 4-pinnate, pinnæ ovato-lanceolate, ultimate pinnules lanceolate decurrent acute sharply pinnatifid segments acute incurved not striated, involucres half oval truncated inserted below the transverse sinus of the segment (or tooth). (Tab. LIX. B.)

Hab. Fernando Po, *Dr. Vogel.* — A rather small plant: frond scarcely a foot long, yet in habit and ramification and form of the pinnæ and segments so much resembling *D. elegans*, that I can point out no other marks of distinction, save the more membranaceous texture, the total absence of striæ or pseudo-veins, and the longer segments or teeth extending far beyond the involucre.

44. D. *Griffithiana*, Hook.; caudex long stout creeping clothed with copious pale-coloured shaggy fimbriato-pilose scales, frond deltoideo-ovate subcoriaceous tripinnate, pinnæ acuminate, pinnules oblong-lanceolate petiolulate obtuse obliquely cuneate at the base pinnatifid, lower ones again pinnate, lobes short obtuse or retuse almost obsolete on the lower margin, involucres flat orbiculate the upper half free placed at a distance from the apex of the lobules and chiefly upon those of the superior margin, rachides (except the primary ones) winged, stipes elongated. (Tab. XLIX. B.) — β. more coriaceous, with a faint appearance of striæ or pseudo-veins.

Hab. Northern India, Assam, *n.* 910, and β. Khasiya, *Mr. Griffith.* — I do not know any species with which this can be confounded, if the blunt segments or lobules of the pinnules be considered, and the form and situa-

tion of the fructifications, which a good deal resemble those of the *Leucostegia* group, though the habit of the plant is that of *Eudavallia*. In the var. *β*. the texture is much more coriaceous, and there is an appearance, though obscure, of the striæ or pseudo-veins which are so remarkable in *D. elegans*.

45. D. *bullata*, Wall.; small, caudex creeping clothed with copious subsquarrose ferruginous subulate crinite scales, frond deltoideo-ovate submembranaceous tripinnate, fertile specimens copiously bullate on the upper side, lower primary pinnæ subopposite ovate acuminate, pinnules lanceolate deeply pinnatifid, segments entire or again inciso-pinnatifid, segments falcato-incurved linear acute, involucres oblong-cup-shaped truncate from the inside of the falcate segment arising from the sinus of a small inner tooth. (Tab. L. B.) D. bullata, *Wall. Cat. n.* 258.

Hab. Nepal, *Dr. Wallich*, 1821. Assam, *Mrs. Mack.* — A small plant with a very long creeping caudex, densely clothed with dark brown scales. Frond about a span long; seen on the upper surface it presents a great number of oval swellings, which correspond with the sori on the opposite side, so that if these fructifications were terminal on a narrow segment, they would resemble those of *Loxsoma*. It is these numerous swellings, no doubt, that suggested the specific name to Dr. Wallich.

46. D. *Canariensis*, Sm.; caudex long stout creeping densely clothed with lanceolato-subulate ciliated often cobwebby scales, fronds deltoid decompoundly pinnate subcoriaceous (frequently pale green when dry) bullate on the upper side, primary pinnæ very broad, ultimate pinnules lanceolate deeply pinnatifid, the segments oval or oblong subcuneate acute soriferous simple or bearing a horn-like segment or tooth on the outside, ultimate rachis of the pinnæ winged, involucres cuneato-cup-shaped truncate terminal on the margin. (Tab. LVI. A.) *Sm. Tent. Fil. Gen. Dorsif. p.* 14. *Sw. Syn. Fil. p.* 134. *Willd. Sp. Pl.* v. *p.* 474. Trichomanes, *L.* Polypodium Lusitanicum, *L.*

Hab. Canary Islands, frequent. Portugal, (*Willd.*) Madeira, common, *Masson*, *Lowe*, *Capt. Finlay*, *Dr. Lemann*. Tangier, *Saltzmann*.— A well known Fern, having been long cultivated in our gardens under the appropriate name of *Hare's Foot Fern;* yet I am not aware that any figure has been given of it, save the very indifferent ones of Magnol and Plukenet. Distinct as the species is to the eye, it is, like many other of the Ferns, extremely difficult to define the characters in words. It is, however, remarkable for the broad deltoid form of the frond and its very compound ramification: in the ultimate divisions and the penultimate ones the rachises becoming winged, and then the frond should be described as pinnatifid rather than pinnate.

47. D. *pyxidata*, Cav.; caudex stout creeping densely clothed with subulate ferruginous cobwebby scales, fronds

coriaceous deltoideo-ovate stipitate (stipes about as long as the frond) tripinnate bullate on the upper side, pinnæ broad lanceolate, pinnules and segments mostly rather obtuse pinnatifid or incised, incisures generally retuse soriferous, involucres truncated at the mouth. (Tab. LV. C.) — *Cav. Præl.* 1801, *n.* 694. *Sw. Syn. Fil. p.* 132. *Willd. Sp. Pl.* v. *p.* 471. *Br. Prodr. p.* 157. — *α.* pinnules mostly obtuse and incisions retuse. (Tab. Nostr. LV. C. *f.* 1, 2). *Sieb. Syn. Fil. n.* 126. *Fl. Mixt. n.* 240. — *β.* pinnæ and pinnules more attenuated, incisions more acute, sori narrower. (Tab. Nostr. LV. C. *f.* 3, 4). D. solida, *Hook. et Arn. Bot. of Beech. Voy. p.* 75, (*not Swartz*).

Hab. *α.* New Holland, (*Cavanilles*), *Brown, Allan and Rich. Cunningham, J. D. Hooker.* Norfolk Island, *Dr. V. Thomson.* — *β.* Port Jackson, *Fraser.* Sydney, *A. Cunningham.* Coral Islands, *Beechey.* — The remark on the difficulty of discriminating different species of Ferns, offered under the preceding, is peculiarly applicable to the present one: for, assuredly, in various specimens and in different parts of the same specimen, not unfrequently, there are various forms of the segments and of the portions of the segments which bear the sori: so that on the one hand it approaches some of the narrow states of *D. solida*, except that the sori are shorter, and on the other *D. Canariensis*, which latter however is always more compound. I am disposed to refer the *D. solida* of Hook. and Arn. l. c. to the present species. The frond is nearly a foot long, and the stipes about the same length.

Subgen. V. Saccoloma. *Sori marginal or a little within the margin. Involucres small, membranaceous, half-cup-shaped, or more rarely reniform, arising from the apex of free parallel veins, often intramarginal, and the margin being sometimes crenated and membranaceous, gives the appearance of accessory involucres. Tropical* Ferns, *of the Old World. Fronds generally tufted or fascicled, or creeping, once or rarely twice pinnated, herbaceous and membranaceous, rarely subcoriaceous.* Saccoloma, *J. Sm., and* Microlepia *in part.* (Hook. Gen. Fil. tab. LVIII. B.)

Obs. Assuredly this group, which some consider deserving of being elevated to the rank of a genus (as a whole, according to the ideas of Presl, or as confined only to one species, the original *Saccoloma elegans*, following the views of Kaulfuss and J. Sm.), presents no characters by which to distinguish it generically from *Davallia*; for it gradually passes into *Microlepia* by means of *D. Khasiyana* and its allies. J. Smith and Kunze consider the marginal teeth of the crenatures in the light of accessory or spurious involucres, and hence more allied to *Dicksonieæ*, but I cannot concur in this opinion.

48. D. *Saccoloma*, Spr.; "caudex creeping," fronds very tall lanceolate pinnated glabrous membranaceous glossy, pinnæ (sometimes a foot long) petiolulate lanceolate acuminate the

thin margin beyond the sori crenate serrated and often lobed towards the attenuated apex obliquely cuneate at the base, veins close parallel simple or forked, involucres shallow half-cup-shaped forming a continuous line along the margin. — *Spr. Syst. Veget.* iv. *p.* 119. Saccoloma elegans, *Kaulf.* "*in Berl. Jahrb. f. die Pharm.* 1820, *p.* 51." *En. Fil. p.* 224, *t.* 1, *f.* 12. *Hook. Gen. Fil. t.* 58, *f.* 1—4. *Kze. in Schkh. Suppl. t.* 41. Neuropteris elegans, *Desv. Mem. de la Soc. Linn. Par.* v. *p.* 292, *t.* 8, *f.* 2.

Hab. Brazil, *Langsdorff, Sellow, Mrs. M. Graham, Beyrich, Prince de Nieuwied, Riedel, Gardner, n.* 159 *and* 5325, (woods, Gongo Soko). Isthmus of Panama, *Dr. Sinclair, Barclay.* Interior of Westmoreland Co. and Fox's Gap, St. George, Jamaica, *Purdie.* Guiana, (*Desvaux*). — A splendid and truly beautiful Fern, which, according to Mr. Purdie, who has recently had the good fortune to discover it in Jamaica, "grows, or rather climbs, to the height of 20 feet," no doubt by means of its caudex, which he adds is "creeping." The fronds themselves are 5—6 feet and more in height. Stipes 1—4 feet and, as well as the main rachis, glossy brown. Pinnæ of a delicate, membranaceous, semipellucid texture, bright green, often a foot long and 1—2 inches wide; the base obliquely cuneate, sometimes, as if by accident, deeply lobed in the lower half (as figured by Kunze, l. c.), attenuated into a narrow caudate serrated acumen at the extremity. Sori so close as apparently to form an almost uninterrupted line on both margins, nearly from the base of the pinnule to the base of the acumen.

As already observed, Professor Kunze (and Mr. J. Smith) considers the crenatures of the pinnæ of *Saccoloma* as spurious involucres, and he describes, in Schkh. Fil. Suppl. p. 86, a nearly allied genus with which I am unacquainted, and which he thus characterizes: —

"Amauropelta, Kze. *Sori* apici venarum subclavato inserti, orbiculares, plani, lineam submarginalem formantes. *Indusium* duplex: *spurium*, crenæ marginis lacinearum primo revolutæ, demum retractæ; *verum*, coriaceum, rugulosum, orbiculare, basi excisum (atrovirens), margine extenuato circumcirca apertum."

"A. *Breutelii*.—Frons coriacea, pinnato-pinnatifida, basi pinnarum subpinnata. Venæ e costa laciniarum ortæ, furcatæ, rarius simplices.

"Hab. St. Kitts, *Breutel*."

49. D. *Imrayana*, Hook.; fronds (tufted?) ovato-lanceolate pinnated, pinnæ submembranaceous opaque oblong-lanceolate obtuse petiolulate very unequally and somewhat doubly crenate obliquely cuneate at the base, sori forming a continuous intramarginal line one at the base of each tooth or lobule of the crenatures, veins oblique once to thrice forked somewhat divaricating, involucres reniform. (Tab. XLIX. A.) — *Hook. Gen. Fil. t.* 58, B. *f.* 5, 6. *Kze. in Schkh. Fil. Suppl. t.* 86.

Hab. Dominica, *Dr. Imray.* — A very distinct and well marked plant, yet assuredly allied to the preceding. Kunze has retained this in *Saccoloma*, and correctly enough; but it is quite evident the crenated margin forms

nothing that can be assimilated to an involucre. The stipes is from a span to a foot long, glossy brown. Fronds about the same length. Pinnules 1—3 inches, rather remote, opaque (not glossy), membranaceous: veins obscure, except when the frond is held between the eye and the light.

50. D. *Hookeriana*, Wall.; fronds (tufted?) tall lanceolate pinnate, pinnæ subpetiolate lanceolate from a broad hastate base gradually acuminated submembranaceous duplicato-crenated sparingly hairy on the costa and veins beneath, veins parallel dichotomous, sori approximate forming a continued line at the base of the crenatures of the margin, involucres half-cup-shaped, stipes and rachis pubescenti-hirsute. (Tab. XLVII. B.)—*Wall. Cat. n.* 2684.

Hab. Mountains of Sylhet and Kamoun, *Wallich*. Assam, *Major Jenkins*.— Stipes a foot or more long, pubescent, at length glabrous. Rachis hirsuto-pubescent. Frond 2 feet and more long. Pinnæ spreading, 4—5 inches long, subpetiolate, hastate at the base, the upper lobe the longest and sharpest. Crenatures of the margin, similar to what are described in the two preceding species, extend beyond the sori; but in no way and at no stage of growth so covering the fructifications, as to constitute even a spurious involucre.

51. D. *villosa*, Wall.; fronds (tufted?) tall broadly ovato-lanceolate firm membranaceous, pinnæ elongate lanceolate subfalcate acuminate pinnatifido-lobate the acuminated apices serrated pubescenti-villous beneath most so on the costa and prominent veins unequally cuneate at the base and subpetiolate, lobes acute crenato-dentate, veins pinnated, sori solitary in the axils of the smaller and upper lobes or serratures and distant from the margin, marginal on the small teeth of the larger lobes, involucres broad half-cup-shaped densely villous, rachis and stipes downy the latter at length glabrous. (Tab. XLVIII. A.) — *Wall. Cat. n.* 244 (*not Don*). D. scabra, *Don*.

Hab. Nepal, *Wallich*.—A very handsome species. Stipes 1—2 feet long. Frond about 1 foot, the inferior pinnæ sometimes 6—8 inches long, upper pinnæ sessile, but with a very unequal cuneate base, the uppermost ones united into a pinnatifid acuminated point.

52. D. *calvescens*, Wall.; fronds (tufted?) tall lanceolate firm membranaceous, pinnæ elongate lanceolate subfalcate acuminate pinnatifido-lobate the apices serrated every where glabrous except the costa beneath which is pubescent, unequally cuneate at the base and distinctly petiolate, lobes acute crenato-dentate, veins pinnated, sori along the toothed margin of the lobes, involucres shallow half-cup-shaped glabrous, rachis and stipes slightly downy the latter at length glabrous. (Tab. XLVIII. B.) — *Wall. Cat. n.* 2983.

Hab. Kamoun, *Wallich*. Khasiya, *Griffith*. — This has much affinity with the last, yet I think Dr. Wallich has rightly distinguished it, and ap-

propriately named it *calvescens*. The veins, and especially the involucres, are quite glabrous, the pinnæ are more distinctly petiolate, and the whole frond is more elongate.

53. D. *Khasiyana*, Hook.; fronds (tufted?) very tall lanceolate bipinnate, stipes elongated, rachis and veins pubescenti-hispid, primary pinnæ petiolate lanceolate acuminate, secondary or pinnules mostly petiolulate subdimidiato-ovate obtuse pinnatifid chiefly on the upper edge, lower lobes obovate deep the rest short, all of them angulato-dentate, veins pinnated with a few scattered hairs beneath, involucres small half-cup-shaped in the axils of the teeth. (Tab. XLVII. A.) —*β*. more glabrous, pinnules less petiolate, less deeply pinnatifid, with fewer and more obtuse lobes.—(Tab. LVII. A.) Microlepia cristata, *J. Sm. En. Fil. Philipp. l. c.* (*name only*).

Hab. Khasiya hills, north of India, *Griffith*. Java; pinnules smaller, (*Count Hoffmansegg*). Ceylon, Mrs. Gen. Walker. *β*. Isle of Ronin, (*Herb. Imp. Acad. Petrop.*) Luzon, *Cuming*, (*n.* 95). — Stipes 2½ feet long, and the lower portion of the frond 2 feet more. The primary pinnæ are 6—8 inches long: the lower pinnules sometimes almost pinnated. The general form of these pinnules assimilates the species with many of the group or subgenus *Microlepia*, and it may be said to form the passage to them. But I place it here on account of its general affinity with the two preceding species, and its fronds being much less divided than in the true *Microlepiæ*.

54. D. *lonchitidea*, Wall.; caudex creeping thick, fronds ample tall tripinnate (primary and secondary pinnules much petiolated) every where glabrous coriaceo-membranaceous, pinnæ large spreading ovato-lanceolate much and narrow-acuminated deeply pinnatifid often pinnated at the base, segments patent lanceolate (often very broad) acuminated lobato-dentate, rachis and costa flexuose, veins pinnated, sori solitary generally in the axils of the teeth near the margin, involucres small half-cup-shaped. (Tab. XLVI. B.) — *Wall. Cat. n.* 240. Microlepia, *J. Sm. Gen. Fil.* Davallia platyphylla, *Don, Prodr. Nep. p.* 10.

Hab. Nepal, *Wallich*. Peninsula of Madras, *Wight, n.* 140. Ceylon, *Mrs. Gen. Walker*. — One of the noblest of the genus, from the size of its fronds and the large and broad pinnules on long glossy petioles. These fronds are much divided, the segments bearing copious fructifications. Mr. J. Smith places this species in *Microlepia*, but if "habit is to be the principal mark of distinction," as Mr. J. Smith observes, it surely is more nearly allied to the original *Saccoloma* than to *Microlepia*.

55. D. *pinnata*, Cav.; caudex creeping scaly, fronds lanceolate pinnate glabrous, pinnæ remote shortly petiolate subcoriaceous opaque linear-lanceolate gradually acuminate obliquely cuneate at the base the upper ones sessile and decurrent, sori a little distant from each other but forming a continued series one at the base of each tooth or serrature,

veins sunk obsolete (inconspicuous) generally forked, the upper veinlet bearing the sorus, involucres small half-cup-shaped, stipes and subtrigonal rachis glossy. (TAB. LX. B. f. 1, 4).— *Cav. Præl.* 1801, *n.* 689. *Sw. Syn. Fil. p.* 131. *Willd. Sp. Pl.* v, *p.* 468. D. flagellifera, *Wall. Cat. n.* 243. *Hook. et Grev. Ic. Fil. t.* 180. D. angustata, *Wall. (according to Presl, not according to our specimen from Wallich).* Saccoloma pinnatum, *Pr.* Microlepia, *J. Sm. Gen. Fil.*

Hab. Philippine Islands, (*Cavanilles*). Luzon, *Cuming, n.* 139. Penang, *Wallich, Lady Dalhousie.* Java, *Blume.*—Evidently allied in habit and fructification to the original *Saccoloma*, and Presl has done right in placing it there, if that genus were worthy of being retained; it differs however from every known species of *Davallia*, except the following, with which it came mixed in Cuming's plants from the Philippine Islands, and from which it may not be specifically distinct.

56. D. *Luzonica*, Hook.; caudex short entangled somewhat creeping paleaceo-crinite, fronds ovato-lanceolate pinnate, pinnæ lanceolate deeply pinnatifid sessile subcoriaceous lobate on the long narrow acumen, segments linear crenato-serrate, veins pinnated obsolete, sori at the base or in the axils of the teeth, involucres small half-cup-shaped, rachis and stipes subtrigonal. (TAB. LX. B. f. 2, 3, 5).

Hab. Luzon, *Cuming*, (with the preceding, *n.* 139). — Had I received this separately from the preceding, I should have felt satisfied of its being a distinct species: but coming in company with that, and finding it to have the same harsh almost coriaceous texture, and other points in common with it, I was led, at first, to look upon it as a variety: still, having no intermediate states, I think it safest to give it as distinct: and the characters are very apparent on the slightest glance at the figures.

57. D. *serrata*, Bl.; "frond pinnate glabrous, pinnæ alternate subsessile linear-lanceolate falcato-acuminate duplicato-serrate cuneate at the base, sori submarginal, stipes glabrous subtetraquetrous." *Bl. En. Fil. Jav. p.* 232.

Hab. Mountains of Java, *Blume.* — Blume places this next to *D. pinnata*, and observes of it, "serraturis obtusis emarginato-bidentatis priori differt."

Subgen. VI. ODONTOLOMA, *J. Sm. Sori intramarginal, generally at the base of a large tooth or lobule. Involucres small, membranaceous, fixed by their more or less broad base, the sides free, often reniform, rarely a little confluent,* i. e. *two from the apices of the adjoining veins (where they are always situated), running into one: or in other words, the sorus, in such cases, appears to originate from the apices of two veins. — Tropical* Ferns *of the Old and the New World. Caudex, I believe, creeping in all the species. Fronds small (rarely or never exceeding a foot in length), membranaceous. Pinnæ or pinnules more or less dimidiate: the lower margin straight or incurved*

(*subfalcate*), *the upper forming the segment of a circle, and more or less toothed or lobed or serrated. Lobules soriferous.* Saccoloma, *Pr.* Lindsæa, *Blume, Kze. and others.* (Hook. Gen. Fil. Tab. CXIV. B.)

Obs. The present is a tolerably natural group, in habit closely allied to *Lindsæa*, and again, on the other hand, through *D. Imrayana*, to our subgenus *Saccoloma*. The last mentioned species possesses, indeed, the involucres rather of the present group: but the form of the pinnules and general habit lead me to prefer placing it amongst *Saccoloma*. In one species, *D. Kunzeana*, there is a disposition in the veins to become reticulated.

* *Simply pinnate.*

58. D. *Boryana*, Pr.; caudex very long stout creeping on trees and scandent, fronds rigid membranaceous linear-lanceolate elongate pinnated attenuated at the base, pinnæ half oblong obtuse or acute obliquely cuneate at the base, lower margin entire quite straight, upper lobulato-crenate often serrate, principal vein parallel with and close to the lower margin giving out upwards 5 or 6 simple or forked veins, sori transversely oblong shallow half-cup-shaped inserted at the base of almost every lobule. — *Pr. Reliq. Hœnk.* i. *p.* 66. *Hook. et Grev. t.* 143. Dicksonia repens, *Bory, Voy.* ii. *p.* 323. *Sw. Syn. Fil. p.* 138. *Willd. Sp. Pl.* v. *p.* 482. Davallia repens, *Desv.* D. Macræana, *Hook. et Arn. Bot. of Beech. Voy. p.* 108 *(younger state, which is also the* Odontoloma Hookeri, *J. Sm.)* Odontoloma Boryanum, *J. Sm.* — *β.* lobules serrated. *Hook. Gen. Fil. t.* 114, B. *Presl, Tent. Pterid. t.* 4, *f.* 20.

Hab. On trunks of trees; Bourbon, *Bory.* Mauritius, *Neraud, Telfair, Wallich, Carmichael.* Philippine Islands, *Hœnke, Cuming, n.* 50. Brahmakoond in Upper Assam, and Khasiya hills, *Griffith.* Sandwich Islands, *Macrae, Barclay, Beechey, Nightingale.* — An elegant Fern, climbing over the trunks of trees, with a long scaly caudex, at length naked, glabrous and shining brown. Stipes and rachis stout, rigid, straw-coloured, frondose often to the very base. Fronds about a foot long. Pinnæ, though thin and semitransparent, of a firm and, as it were, rigid character, scarcely an inch long: the upper margin more or less crenated with little lobes, and, as represented in the 'Genera Filicum,' occasionally serrated. Sori sometimes, though rarely, confluent, giving the plant still more the character of *Lindsæa.*

59. D. *pulchella*, Hook.; small slender, caudex creeping filiform with scattered scales, frond linear-lanceolate pinnated rather flaccid, pinnæ approximate oval subdimidiate obtuse, lower margin slightly curved, upper with 3 or 4 broad irregular crenatures, principal vein diverging upwards from the lower margin and bearing 2 or 3 simple or forked veins, involucres small subreniform inserted at the base of the lobules rarely confluent, stipes and rachis firm straw-coloured filiform.

(Tab. LIII. B.) Odontoloma pulchellum, *J. Sm. En. Fil. Philipp. (name only). Field. et Gardn. Sert. Plant. t.* 51.

Hab. Luzon, *Cuming, n.* 217.—A very distinct species, though allied to the preceding. It is much smaller, very slender and graceful in every part. Pinnæ approximate, only slightly dimidiate, the lower margin not forming a straight line, but a curve, with the convex side outwards: the veins are free and distinct, and the principal one does not run parallel with and close to the lower margin, as in the preceding, but inclines upwards from its commencement. Two outer veinlets next the apex often bear one sorus. The figure in Messrs. Fielding and Gardner's 'Sertum Plantarum' is very accurate, and I should not have again given it here, but my plate was prepared before their's was published.

60. D. *Parkeri*, Hook.; small flaccid, caudex short creeping sending out long smooth fibrous radicles, fronds narrow-lanceolate from a rather broad base, pinnæ close membranaceous thin half oval broad and subfalcate (lower margin incurved), upper margin unequally lobato-crenate with 3—5 lobes, principal vein not parallel with the lower margin but slightly diverging and bearing 3—4 simple or forked veins, involucres small subreniform at the base of the lobules sometimes confluent (2 veinlets bearing 1 sorus), stipes and rachis filiform dark coloured. (Tab. LIII. C.)

Hab. British Guiana, *C. S. Parker.* — Quite different from the two preceding. Fronds very flaccid and thin, shorter and broader than the last, especially at the base, with very differently formed pinnæ, and dark-colored stipes and rachis.

61. D. *hemiptera*, Bory; "caudex creeping slender scaly, fronds linear pinnate, pinnæ alternate dimidiate pinnatifid above, segments bifid." *Bory in Belanger Voy. Bot. p.* 75, *t.* 7, *f.* 2. Saccoloma? hemipterum, *Pr.* Davallia digitata, *Kaulf. Herb. (according to Presl).*

Hab. On the trunks of trees, forests of Java, *Belanger.* — To judge from the figure and description, this has the habit of *D. Boryana*, with the same scandent caudex and similarly shaped pinnæ; but the whole plant is smaller and the upper side of the pinnæ is cut almost to the base into narrow linear, entire or bifid segments: the fructification is unknown, so that the very genus must be doubtful.

62. D. *adiantifolia*, Hook.; "frond pinnate membranaceous glabrous, pinnæ (numerous small) subsessile trapezoid obtuse crenate on the superior margin, sori submarginal solitary, stipes and rachis glabrous." Aspidium adiantoides, *Bl. En. Fil. Jav. p.* 145. Saccoloma adiantoides, *Pr.*

Hab. Trees, Moluccas, *Blume.* — With this I am unacquainted. Presl refers it to *Saccoloma*; but the above is all the description that is given of it.

Dubious species probably of this group.

63. D.? *cuneifolia*, Hook.—Saccoloma cuneifolium, *Presl, Tent. Pterid. p.* 126, name only.

** *Bipinnate, pinnules entire or only lobulate.*

64. D. *Kunzeana*, Hook.; "frond ovato-triangular membranaceous rather firm glabrous bipinnate, pinnæ shortly petiolate, lowest ones opposite patenti-erect lanceolate acuminate, pinnules subsessile dimidiato-oblong obtuse at the base above truncato-cuneate, uppermost ones gradually minute subconfluent, lowest ones flabellate, all of them inciso-dentate on the upper margin, the teeth rounded soriferous, sori linear-oblong (transversely), stipes and rachis tetragonous glabrous." *Bl.* Lindsæa davalloides, *Bl. En. Pl. Jav. p.* 218. *Kze. in Schk. Fil. Suppl. p.* 12, *t.* 7. "L. pectinata, *Reinw. MSS.*"

Hab. Mountains of Java, *Blume.*—A very handsome plant, according to Kunze's figure; with pinnules resembling those of *D. Boryana*, but the plant is bipinnate. According to my views of the genera of Ferns, this cannot be referred to *Lindsæa*, for the involucre is not only much smaller than the lobe which bears it (which the author above quoted considers the outer indusium), but the colour and texture are quite different, as represented in Kunze's plate. The fructification, indeed, and the habit of the species are in perfect accordance with the *Odontoloma*-group of *Davallia*, and the plant should not be separated from it. The veins in the magnified figure not only meet at the sorus, as is common to others of this subgenus, but they anastomose once below the sorus towards the apex of the pinna, exhibiting an approach to reticulated venation. Blume observes of this plant (and I am unacquainted with it myself, save from figure and description) "a *Lindsæa composita*, Willd., facillime distinguitur pinnulis margine superiori incisis, terminalibus decrescentibus."

*** *Bipinnate, pinnules deeply pinnatifid.*

65. D. *Blumeana*, Hook.; caudex creeping, stipes very long triquetrous firm, frond ovate bipinnate, pinnæ alternate lanceolate attenuate, pinnules membranaceous sessile half-oblong, from the upper edge cut down to the base in a pinnatifid manner into extremely narrow linear distant simple or generally forked segments much dilated at the apex and soriferous mostly toothed, vein solitary in each segment, involucres minute transversely oblong smaller than the apex of the segment subreniform. (Tab. LIV. A.) — Lindsæa tenuifolia, *Bl. En. Fil. Jav. p.* 219. Odontoloma tenuifolia, *J. Sm. En. Fil. Philipp. l. c.*

Hab. Parasitic on trunks of trees in the forests of Java, *Blume.* Isle of Leyte, *Cuming, n.* 309.—A most distinct, well marked and elegant species, possessing the dimidiate pinnules so common to the present subgenus; though at first sight appearing very different, on account of the long, narrow, deep segments; so narrow that the vein seems only to have a wing on each side and running parallel with it. It is one of those species which exhibit a strong affinity with *Lindsæa* as well as *Davallia*; but the circumstance of the involucre being much smaller than the terminal lobe, and

withering, as it often does, while the apex of the lobe is still green and vigorous, induces me to prefer placing it in *Davallia:* and it is in perfect harmony with individuals of the present subgenus.—Stipes a span or more high, triquetrous, stout, firm, brownish straw-colour, glossy. Frond a span or more long, ovate in circumscription. Primary pinnæ patent, 4—5 inches long, much attenuated; the rachis throughout firm, stout and wiry, stramineous. Pinnules ½ to ¾ of an inch long, truly dimidiate, half-ovate, the lower margin forming a straight or falcate line, the upper the segment of a circle, deeply divided to the lower margin into narrow linear simple or forked segments, resembling some *Trichomanes* or *Hymenophyllum*; the apex dilated and usually toothed, bearing the sorus: the uppermost pinnules are gradually smaller and are reduced to extremely narrow simple or forked almost setiform segments.

Subgen. VII. MICROLEPIA, *Pr. Sori intramarginal, on a small tooth or lobule generally below a sinus of a lobe. Involucre small, membranaceous, half-cup-shaped, the mouth truncated (rarely suborbiculari-reniform), from the apex of a free, more or less divaricating, vein or veinlet.—Tropical Ferns of the Old and New World. Caudex creeping (probably in all). Fronds mostly ample, decompound, membranous or verging towards it; ultimate pinnules or lobules usually small and bearing small fructifications.* (HOOK. GEN. FIL. TAB. LVIII. A.)

OBS.. Of all the groups or subgenera of *Davallia*, this is to me the least satisfactory, and I preserve it in deference to those who are in favour of constituting *Microlepia* a distinct genus. The *D. polypodioides* may be considered the type of this, and the most distinct in habit and character and in the small cup-shaped involucres, which afford something tangible: still we have in *D. Jamaicensis* a fern with so completely the habit and general appearance of *D. polypodioides*, that, were it not for the involucres, I should take it for the most common form of that species, but the involucres are quite those of a *Leucostegia*. Again, some species have an elongated half-cup-shaped, or if I may so say, cuneated involucre; these, both in fructification and texture of the frond, resemble *Saccoloma*, and are only here distinguished from that subgenus by their more compound fronds. I have placed the subgenus *Odontoloma* between the two groups in question, on account of its affinity in habit and composition with the § *Saccoloma*, especially with *D. Imrayana*.

66. D. *Amboynensis*, Hook.; rather tall, frond ovato-lanceolate subcoriaceous tripinnate, pinnæ much acuminate, lower secondary ones very long acuminate, pinnules lanceolate subfalcate pinnatifid cuneato-attenuated at the base and decurrent, sori small in the inner margin of the lobules generally at the sinus, stipes elongated. (TAB. LVI. C.)—Davallia Moluccana, *Pl. Crypt. Roxb.** *p.* 54. *Wall. Cat. n.* 229

* We have recently received from Mr. Griffith his '*Cryptogamous Plants of* Dr. Roxburgh, *forming the 4th and last part of the* Flora Indica, published by permission of Government from Dr. Roxburgh's MSS. in the

(*not Blume*).—Dicksonia straminea, *Bory, in Duperrey, Voy. Bot. p.* 280? (*not Labill.*).

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library of the H. C. Botanic Gardens, Calcutta.' The laudable object which Mr. Griffith had in view in their publication is thus stated in the Preface. "I have not yet become acquainted with the circumstances, owing to which the *Flora Indica* has not been heretofore completed, or with the reason of its being so disfigured by obscurities and typographical errors. But considering it to be a positive duty of all Superintendents of public institutions to make known to the fullest extent the meritorious labours of their predecessors, I have availed myself of the permission of Government to place on record the labours of Dr. Roxburgh in this department of Botany. The neglect under which these MSS. have been buried since 1817, and the absolute want of his authentic Herbarium, under which these Botanic Gardens labour, prevent me effectually from doing justice to the memory of Roxburgh, beyond showing the extent to which he had observed the higher Cryptogamic plants. His names probably in very many instances have been passed over, and the law of priority of publication and definition may hinder many from being adopted. But I am sure that Botanists will exert themselves and determine that his MS. names shall not be passed over in favour of any other MS. names, given in neglect of Roxburgh's characters, descriptions or drawings."—"I beg to address myself here in particular to Sir Wm. Hooker, who is said to be engaged in a work on the Species of Ferns."

Mr. Griffith here seems to forget that the various circumstances which prevent him from doing that justice which he complains has not been rendered to the memory of Dr. Roxburgh, must equally exist in my case, and even more so; for, in many instances, to compensate for very inefficient descriptions, he has had the original drawings to refer to: but, although references are given to plates apparently intended to accompany the work just mentioned, and said to be reduced copies of Roxburgh's invaluable series of botanical drawings, yet none such have come with the copy received by me. Here then, in cases where the nomenclature of Dr. Roxburgh and Dr. Wallich may be at variance, I have to choose between the generally very *incomplete definitions* now first published of the former, and *authentic specimens* given with names, which, as well as the printed Catalogue, have been distributed with an unexampled liberality, of the latter. The very first species which it has been my lot to investigate, happens to be the one to which this note is appended, an Amboyna specimen received from Mr. Webb. Had I been left to Dr. Roxburgh's character of little more than four brief lines, I should have failed to determine my plant; but by means of Dr. Wallich's specimen I am able to ascertain it and to show that Dr. Wallich has done that justice to the memory of Dr. Roxburgh, which in this instance at least (and I fear it will be so in many others) Mr. Griffith's laudable publication of Dr. Roxburgh's MSS. will fail to accomplish.

I must here again beg to repeat my feeble testimony to the immense services rendered to the cause of Indian Botany by Dr. Wallich, in distributing, with names and a Catalogue, the treasures collected by himself and others in the Honourable Company's territories. The genera and species (I speak especially in reference to the Ferns) are discriminated with a degree of accuracy and judgment which show that they have been care-

Hab. Moluccas, *Roxburgh.* Amboyna, *A. Smith, in Herb. Banks.* (*and in Herb. Hook. from P. B. Webb, Esq.*) Offack, Terre des Papous, *D'Urville,* (*in Herb. Hook.*)—Stipes a foot and more long, erect, flexuose, rather slender, rigid, glossy brown, almost black below. Frond a foot or more high; readily distinguished among this group of Ferns by the subcoriaceous texture, long attenuated lower pinnæ, and the lanceolate, acuminate pinnules, together with the position of the sori in the sinus of the segments. I am induced to consider Bory's *Dicksonia straminea* to belong to this, rather than Labillardiere's plant; not only from the description, but from my possessing a specimen from D'Urville, of our present *Davallia,* gathered at Offack.

67. D. *inæqualis,* Kze.; caudex creeping, frond ample tripinnate glabrous coriaceo-membranaceous rather glossy full green when dry, ultimate pinnæ distant obliquely subrhombeo-lanceolate or ovato-lanceolate the base attenuato-cuneate subpetiolate acute or acuminate inciso-lobate and serrate, the upper ones coadunate into a narrow pinnatifid apex the lobes very acute, veins prominent, ultimate rachis slightly winged, sori generally at the base of an axillary tooth, involucre half-cup-shaped subcuneate (i. e. the base attenuated) broader in age.—*Kze. Syn. Pl. Crypt. Poepp., p.* 87. *Pl. Poepp. in Herb. Hook.*—*α. major;* ultimate pinnæ 1—2 or 3 inches long. (Tab. LVII. B.) Davallia alata, *Heward, Mag. of Nat. Hist.* 1838, *p.* 465.—*β. intermedia;* ultimate pinnæ ¾ to ½ an inch long.—*γ. minor;* ultimate pinnæ ½ an inch rarely exceeding an inch long, of a rather more rigid texture. (Tab. LVIII. A.) Microlepia alata, *J. Sm. En. Fil. Philipp. l. c.*

Hab. *α.* Peru; Maynas, *Poeppig;* Pangoa, *Mathews, n.* 1097. Brazil; Corcovado, and damp woods in the Organ mountains, *Gardner, n.* 202; Ilhios, (*Moricand*). Trinidad, *Lockhart, Aldridge.*—*β.* Jamaica, *Heward, Wiles.* Ceylon, *Mrs. Gen. Walker.* Isle of Mindoro, *Cuming, n.* 360 (frond more membranaceous).—*γ.* Luzon, *Cuming, n.* 119. Herb. Carmichael (*without locality*).—So different is what I here call var. *γ.* from the type of the species, in the size of its pinnules, that when I had the figure prepared of it, I did not suspect its belonging to the same species. A pretty extensive suite of specimens, however, both from the old and the new world, lead me to the conclusion that they are merely forms of one and the same species; and Mr. J. Smith has expressed a similar opinion. The species is clearly defined by Kunze, who alludes to its supposed affinity to *D. distans,* Kaulf., a Fern indeed unknown to him, as it is to me. Our plant bears no inconsiderable resemblance to our *Dicksonia Plumieri,* but the pinnules are at all times much smaller, more divided, and the involucres are truly those of *Davallia.*

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fully studied, even did not a copy of Dr. Wallich's own MSS. in my possession abundantly prove the fact, and which fully justifies me in sacredly preserving his names, whenever I do not find a clear right of priority in favour of any other person.

68. D. *distans*, Kaulf.; "fronds tripinnate, pinnules ovate obtuse cuneate at the base upper ones confluent, fertile ones crenulate above, involucres subrotund." *Kaulf. En. Fil. p.* 223.

Hab. Brazil, (*Herb. Martens*).—"Primary and secondary pinnæ very distant: pinnules membranaceous, ½ an inch long. Position of the fructification nearly as in *Davallia adiantoides* (*Dicksonia Plumieri*, nobis)."—Imperfect though the description is, Mr. J. Smith and Mr. Gardner have believed the *D. inæqualis* to be intended by it; with which however it does not at all accord.

69. D. *hirta*, Kaulf.; tall, fronds erect rigid ovato-lanceolate much and gradually acuminate rather glossy tripinnate, pinnules approximate rhombeo-lanceolate subdimidiate acute decurrent, upper ones coadunate, all of them inciso-pinnatifid, segments acute, sori small on the inner margin in the sinus of a lobe, involucres half-cup-shaped, veins prominent and hairy especially beneath, rachis hispido-tomentose.—*Kaulf. En. Fil. p.* 223. Dicksonia Kaulfussiana, *Gaud. in Freyc. Voy. Bot. p.* 368? (*See mention of this plant, supra, p.* 71.) Davallia villosa, *Don, according to Sprengel.*—β. larger and with laxer ramification.

Hab. Sandwich Islands; Oahu, *Chamisso, Beechey, Barclay, Dr. Diell, Douglas, and others.* Nepal? (*Don*).—β. Ceylon, *Mrs. Gen. Walker.*—A very beautiful and very distinct Fern, with something of the rigid habit and general appearance of the *Polystichum* group of *Aspidium*: though more divided. Stipes and main costa rigid: the form of the ultimate pinnules and their sharpness bring the species near to *Dav. inæqualis*, but the habit of the plant, and the hairiness and the involucres are considerably different.

70. D. *polypodioides*, Don; caudex creeping, frond large ovate or deltoid acuminate tripinnate flaccid more or less hairy or downy especially on the veins and costæ beneath, primary pinnæ and lower secondary ones distant and acuminate, pinnules oblong or rhombeo-lanceolate obtuse deeply pinnatifid, the lobes ovate or obovate entire or irregularly inciso-lobate or again pinnatifid suboblique very obtuse, sori rather large (when perfect) usually solitary on the entire lobes, several on the pinnatifid ones and in the sinuses within the margin, sometimes on a small tooth more numerous on the superior margin, involucres small half-cup-shaped glabrous or rarely hispid, rachis downy or hispid on the underside.—*Don, Prodr. Fl. Nep., p.* 10. Microlepia polypodioides, *Pr.* Dicksonia polypodioides, *Sw. Syn. Fil. p.* 137 and 356. *Willd. Sp. Pl.* v. *p.* 488. Davallia flaccida, *Br. Prodr. Nov. Holl. p.* 157. *Bl. En. Fil. Jav. p.* 237. *Don, l. c. p.* 10? D. Nepalensis, *Spr.?* Microlepia flaccida,

J. Sm. Polypodium Speluncæ, *L.* Polypodium nudum, *Forst. Prodr. n.* 446 (*according to Herb. Banks.*) Polypod. cristatum, Houtt. (*according to Brown*). Cænopteris Japonica, *Willd. Phyt. p.* 8 *f.* 1 ? (*Br.*) Dicksonia flaccida, *Hook. et Arn. in Bot. of Beech. Voy. p.* 108, *in part.*—*α. subglabra;* fronds nearly glabrous or but slightly hairy or pubescent. D. virens, *Wall. Cat. n.* 264. D. Roxburghii, *Wall. Cat. n.* 2218. D. puberula, *in part, Wall. Cat.* 262|2.—*β. pubescens;* fronds pubescent with short close down extending often to the involucres. D. puberula, *Wall. Cat. n.* 262|5. D. rhomboidea ? *Wall. Cat. n.* 262|3. D. pyramidata, *Wall. Cat. n.* 261.—*γ. hispida;* fronds hairy or hispid especially on the underside upon the costa and veins and often on the involucres. D. pilosula, *Wall. Cat. n.* 263.—*δ. rhomboidea;* larger in every part, nearly glabrous pubescent or hairy. D. rhomboidea, *Wall. Cat. n.* 257. Microlepia rhomboidea, *Pr. Tent. Pterid.* (*name only*), *and also f.* 22, *single lobe. J. Sm. Gen. Fil.* (*name only*).

Hab. Tropical or subextratropical regions, probably throughout the world. New Holland (Tropics), *Brown.*—*a.* Ceylon, *Mrs. Gen. Walker.* East Indies, *Roxburgh, Dr. Buchanan Hamilton.* Madras Peninsula, *Dr. Wight.* Mergui, *Griffith.* Assam, *Griffith, Major Jenkins.* Sincapore, Tovay, Nepal, &c., *Wallich.* Java,* *Millett, Blume.* China, *Beechey.* Oahu, *Menzies, Beechey.* Brazil, *Swainson, Macrae.* Fernando Po, *Dr. Vogel.*—*β.* Singapore, and Penang, and Martaban, *Wallich.* Assam, *Jenkins.* Mergui, *Griffith.* Java, *Zollinger, n.* 513. Macalisberg, subtropical South Africa, *Burke, n.* 513.—*γ.* Nepal (with long scattered hairs), *Wallich.* Ceylon, (almost hispid beneath), *Mrs. Gen. Walker.* Courtalam, *Wight.* Amboyna (ex *Herb. P. B. Webb*). Khasiya (very hispid especially beneath and on the involucres, the ultimate lobes of the pinnules more uniform, frond narrower), *Griffith.*—*δ.* Nepal, *Wallich.* Assam, *Griffith, Jenkins.* Luzon, *Cuming, n.* 7, according to Mr. J. Smith; but my specimens rather resemble *a.*—The more I study the Ferns, and compare specimens from different countries, the more difficult I find it to define, in a specific character, the essential distinguishing character of species with the much divided fronds; so different are they, according to locality, to age on the various portions of the same individual, and other circumstances. Then the nature and degrees of pubescence augment the difficulty: and all these difficulties seem to be combined in the present species. I could not, however, have ventured to unite so many supposed species, as I have done, without the means of comparing a multitude of forms from various countries, both in the old and new world, and which have led me to the above conclusions. Perhaps I ought not to have stopped here, but added two or three of the following, if I had been furnished with still more ample suites of specimens. The present species has a good

* In some of the old specimens from Mr. Millett, the fructifications form dense pulvinuli, apparently from the copious pedicels whence the capsules have fallen.

deal the appearance of *Dicksonia cicutaria*, Sw. and is, I fear, often confounded with it. Blume mentions a var. "pinnulis secundariis sursum subinciso-crenatis deorsum integerrimis."

71. D. *proxima*, Bl.; "frond (ample) tripinnate glabrous somewhat downy on the costæ beneath, pinnæ alternate remote, pinnules lanceolate very much acuminated, secondary ones sessile trapezoideo-oblong obtuse incised, superior ones entire confluent, lower ones slightly pinnatifid, sori punctiform placed near the margin semiorbicular, rachis and stipes a little rough." *Bl. En. Fil. Jav. p.* 238.

Hab. Java, *Blume*.—"Closely allied to *D. flaccida*, Br. (*D. polypodioides* nob.): but distinct in the subcoriaceous frond and the longer caudate pinnules." In the province of Bantam the same author finds a var. "B;" with the secondary pinnules rather remote, oblong-obtuse, doubly inciso-serrate,—(an species?)

72. D. *Jamaicensis*, Hook.; frond ample tripinnate flaccid glabrous or with a few scattered hairs beneath on the veins and costa and rachis, primary and secondary pinnæ oblong moderately acuminate, ultimate pinnæ subdimidiato-oblong obtuse deeply pinnatifid the segments longer on the upper margin all of them ovate slightly falcate obtuse dimidiate entire at the lower margin 2—3 lobed at the superior one, sori at a little distance from the margin on a lobule near the sinus, involucres suborbiculari-reniform (!) flat. — Davallia flaccida, *Hook. et Arn. in Bot. of Beech. Voy. p.* 101 *in part.*

Hab. Jamaica, *Wiles*, *Dr. Bancroft*, *McFadyen*. Oahu? *Beechey*.— A species so much resembling *D. polypodioides*, that I can point out no mark of distinction save the different form of the involucre, and that, instead of being half-cup-shaped as in the *Microlepia* group, is broad and flat and between orbicular and reniform, quite free at the apex and sides and attached only by a rather broad base. This is invariably the case in three specimens received from three different collectors in Jamaica; and on carefully inspecting one of my specimens of supposed *Dav. polypodioides* from Oahu I find a similar involucre; but being young the form is not so clearly and satisfactorily defined as in the West India plant.

73. D. *trichosticha*, Hook.; frond ample submembranaceous bi-tri?-pinnate, primary pinnæ a foot long the rachis winged above, ultimate pinnæ or pinnules sessile obliquely cuneate at the base oblong-lanceolate acuminate pinnatifid deeply so toward the base, upper inferior lobe the largest, all of them ovate obtuse nearly entire or crenato-lobate slightly hairy above densely and minutely pubescent almost concealing the veins beneath, sori small rather distant from the margin, involucres small half-cup-shaped very downy.—Microlepia trichosticha, *J. Sm. En. Fil. Philipp. l. c. name only.*

Hab. Isle of Samar, *Cuming*, *n.* 328.—Allied in some respects to *D. polypodioides*, especially to the larger state of it, var. *rhomboidea*; but the only specimens I have seen are less compoundly divided, the pinnæ are more regularly pinnatifid, and there is a compactness in the downy clothing beneath (almost pulverulent) covering the whole underside of the frond, different from what I have observed in any allied species.

74. D. *ciliata*, Hook.; caudex creeping crinite, frond ovato-lanceolate very flaccid membranaceous hairy especially on the veins (hairs soft silky), pinnate, pinnæ from a broad base oblong acuminate bipinnatifid, primary segments oblong obtuse separated from each other almost to the rachis, ultimate ones ovate subfalcate very acute ciliated entire or with one or two minute teeth, sori small at a distance from the margin almost in the centre of a segment, involucres small half-cup-shaped ciliated, stipes and main rachis (which is rigid) pubescent with short brown hairs. (Tab. LX. A.)—Leucostegia hirsuta, *J. Sm. En. Fil. Philipp. l. c. name only*, (*not* Davallia hirsuta, *Sw.*)

Hab. Luzon, *Cuming*, *n.* 174.—An elegant and well marked species, yet the involucre is not that of *Leucostegia*, but of the *Microlepia* group, with which the plant quite accords in habit. The caudex is creeping, about the thickness of a duck's quill, clothed with long crinite hairs. Stipes about a span long, brown, with short pubescence, which extends to the main rachis. Frond 1½ to 2 feet long, broad or ovato-lanceolate, acuminate, first pinnated, with the pinnæ twice pinnatifid in a very regular and beautiful manner; the veins are clothed, and the margin and involucre are fringed, with very slender soft hairs.

75. ? D. *gracilis*, Bl.; "frond bipinnate below, above simply pinnate, pinnæ lanceolate very much acuminate, pinnules linear rather obtuse subserrulate decurrent glabrous, sori submarginal, stipes tetraquetrous hairy at the base, above as well as the rachis glabrous.—*Var.* B. pinnules elongato-linear." *Blume En. Fil. Java*, *p.* 233. Microlepia gracilis, *J. Sm. Gen. Fil. l. c.*

Hab. Woods in mountain-places, Java, *Blume*.—"Its place," Blume observes, "is between *Dav. adiantoides*, Sw. (which is our *Dicksonia Plumieri*) and *Dav. platyphylla*, Don, (*D. lonchitidea*, Wall. and this work)."—From what may be considered an authentic specimen of this species, in Mr. J. Smith's Herbarium, received from Reinwardt, it would appear that it is identical with our *D. Luzonica* (*supra p.* 174, *Tab.* LX. B. *f.* 2. 3. 5): yet that plant is not bipinnate, but pinnæ with the pinnæ pinnatifid, and is surely not naturally allied to the plants indicated by Dr. Blume, but rather to *D. pinnata*, of which it is to be feared it may prove only a more divided form.

76. D. *Moluccana*, Bl. (not Roxb.); "frond below triplicato-pinnate above bipinnate membranaceous glabrous, pinnæ subalternate ovato-lanceolate, pinnules cuneato-lanceolate rather obtuse decurrent subpinnatifid, segments obtuse entire,

sori solitary in the sinuses, rachis margined, stipes tetraquetous glabrous." *Blume En. Fil. Jav. p.* 237.

Hab. Moluccas, *Blume.*—With this I am unacquainted. Blume says of it "habitu maxime similis *Davalliæ gracili.*"

77. D. *splendens*, Bl. "frond bipinnate membranaceous and as well as the stipes glabrous, pinnæ subopposite, pinnules cuneate at the base lower ones ovato-lanceolate acuminate pinnatifid upper ones confluent into a dentate acumen, segments oblong obtuse subserrate, sori ——?" — *Bl. En. Fil. Jav. p.* 234.

Hab. Isle of Banda, *Blume.*—"Between *D. adiantoides*, Sw. (*Dicksonia Plumieri*, nobis) and *D. arborescens*, Willd. (*Dicks. Pavoni*; nob. supra p. 74), differing from the former by its obtuse laciniæ, and from the latter by its caudex not being arborescent?" — The only *Davallia* that I am acquainted with that can be likened to our *Dicksonia Plumieri*, is *Dav. inæqualis*, Kze. and it is probable that the present and two preceding species should be placed next them.

Dubious Species of this Subgenus.

78. D. *Brasiliensis*, Hook.—Microlepia Brasiliensis, *Presl, Tent. Pterid. p.* 125 (*name only*) *tab.* 4, *f.* 23. There is little in the figure now quoted, which only gives a solitary pinnule, to distinguish it from *D. inæqualis*, of which a pinnule is also represented on the same plate, *fig.* 21. I am not aware that the plant is anywhere described.

79. D. *Manilensis*, Hook.—Microlepia Manilensis, *Presl, in Herb. Meyen, and in Tent. Pterid. p.* 125 (*name only*).

80. D. *humilis*, Hook. — Microlepia humilis, *Presl, Tent. Pterid. p.* 125 (*name only*). "Dicksonia humilis, *Willd. Herb. n.* 20164." Of this and the preceding I am not aware that any thing further than their names is anywhere recorded.

Subgen. VIII. CUNEATÆ. — Davallia § Odontosoria, *Pr. in part, and* § Colposoria, *Pr. in part.* Davallia (vera) *J. Sm. in part.*— *Sori transversely oblong, nearly of the same texture as the frond, placed at the apex of a narrow segment and generally occupying the whole breadth of that apex, so that, in many, if the apex of the segment were altered in texture, it would be considered a portion of the involucre, and resemble the fructification of a* Lindsæa. — *Ferns of the tropics, or subextratropical, both of the Old and New World. Caudex creeping or none? Fronds coriaceous or submembranaceous, sometimes herbaceous, often firm and dark brown in drying, erect and unarmed, or scandent and spinous, generally much decompound, the segments or divisions cuneate, mostly narrow*

and linear with a much attenuated base, always glabrous. Veins either single, or solitary in the centre of each narrow segment, dividing and forked with nearly parallel branches to meet a forking of the segment. (Presl, Tent. Pterid. Tab. 4, f. 27.)

Obs. The present appears to me an extremely natural group, having assuredly a peculiar habit, and sori that resemble nearly as much those of some *Lindsæa* as the type of *Davallia;* yet no one that I am aware of has sought to separate it from the latter genus. Presl, indeed, has placed some in his § *Colposoria*, which, if I understand them rightly, ought unquestionably to be referred to his § *Odontosoria.*

* *Fronds not scandent, unarmed.*

81. D. *tenuifolia*, Sw.; caudex creeping (short?) woolly with subulate ferruginous scales, stipes long, frond erect ovato-lanceolate generally elongate glabrous subcoriaceous brown when dry bi-tri-pinnate with the rachis compressed and winged (or in other words bitripinnatifid), the segments or ultimate divisions approximate forked linear-cuneate truncate the apex slightly erose, involucres terminal and solitary or in pairs short (transversely) oblong slightly erose.—*Sw. Syn. Fil. p.* 133 *and* 350. *Willd. Sp. Pl.* v. *p.* 477, *(excl. the syn. of* D. venusta, *Schkh. Fil. t.* 128). *Pr. Tent. Pterid. t.* 4, *f.* 27. *Bl. En. Fil. Jav. p.* 239. D. remota, *Kaulf. Hook. et Arn. Bot. Beech. Voy. p.* 108. *Bory, in Duperrey, Voy. Bot. p.* 280. Adiantum cuneatum, *Forst. Prodr.* (*not* L.)—*β.* segments broader.

Hab. East India and East Indian Islands, probably general. Assam, *Griffith*, *Jenkins.* Nepal, and Kamoun, *Wall.* Sylhet, *De Sylva.* Khasiya, *Griffith.* Madras Peninsula, *Wight.* Mauritius, (*Sw.*) *Wallich Cat. n.* 245, *and others.* China, *Beechey.* Java, *Blume*, *Millett.* Ceylon, abundant, *Mrs. Gen. Walker and others.* Sandwich Islands, *Macrae*, *Barclay*, *&c.* Madagascar, *Dr. Lyall*, *Boyer.*—*β.* Luzon, *Cuming*, *n.* 59. China, *Beechey.* Bonin (*Herb. Imp. Acad. Petrop.*)—A well marked species, less variable than many of the genus. It appears to be wholly confined to the tropical countries of the old world. Those who, like Sprengel, speak of it as a native of the West Indies, unquestionably confound the *D. clavata* with it, mistaking Schkuhr's figure, which is nevertheless a very excellent one.

82. D. *trichomanoides*, Bl.; "frond subtriplicato-pinnate membranaceous glabrous, pinnæ subrhombeo-ovate rather remote, pinnules trapezoid oblong deeply pinnatifid (lower ones deeply pinnatifid), segments narrow cuneato-linear obtuse subbifid, fertile ones truncato-emarginate at the apex with a solitary sorus, segments oblong truncate, rachis margined above and as well as the subtrigonal stipes glabrous." *Bl. En. Fil. Jav. p.* 238.

Hab. Mountains of Java and the Moluccas, *Blume.*—"Differs from

D. tenuifolia, Sw. in the smaller fronds, the oblong almost hypocrateriform sori immersed in the apex of the laciniæ." *Bl.*

83. D. *Chinensis*, Sw.; caudex creeping crinite with glossy brown subulate scales, frond ovato-lanceolate shorter than the stipes glabrous opaque coriaceous (as if fleshy when recent) dark brown ferruginous beneath bipinnate, pinnæ lanceolato-ovate deeply pinnatifid, pinnules rather distant obovato-cuneate the apex more or less rounded and entire attenuated below simple or 2—3-lobed, lobes short somewhat rounded, veins several obscure sunk, sori solitary or two in each lobe and then subconfluent, in age very prominent, superior rachises winged. — *Sw. Syn. Fil. p.* 133. *Willd. Sp. Pl.* v. 474. *Langsd. et Fisch. Fil. p.* 23, *t.* 27 (*excellent*). Trichomanes Chinense, *Osb. Voy. ed. Angl.* ii. *p.* 357, *t.* 6. *Linn. Sp. Pl.* 1562. Davallia Chusana? *Willd.* Trichomanes Chusanum? *L.* Davallia ferruginea? *Cav. Præl. n.* 691. *Sw. Syn. Fil. p.* 134. *Bl. En. Fil. Jav. p.* 239? *Nees. et Bl. Act. Acad. Cur.* xi. *t.* 12, *f.* 4?

Hab. China, *Osbeck*, *Beechey*. Isle of Bonin (*Herb. Act. Petrop.*) Philippine Isles? *Cavanilles*. Java, *Blume?* — I was disposed to consider this a variety of *D. tenuifolia*, Sw., receiving it, as I have done, from China (but from China alone) in company with that species: still, a further examination of specimens leads me to the conclusion that it is truly distinct; and though a rude, yet the figure in Osbeck is a faithful representation of the species. It is generally much smaller than *D. tenuifolia*, and the stipes considerably shorter in proportion, the texture is far thicker, more coriaceous, and one could suppose it to be almost fleshy when recent; the pinnules are much broader, not truly cuneate, but obovato-cuneate; that is, the angles are rounded off and the apex is quite entire. The colour, when dry, is even of a darker brown, at least above, for the underside is almost always ferruginous: and the veins are sunk and obsolete, of course, more copious in proportion to the breadth. I am uncertain as to Blume's *D. ferruginea*, and am rather disposed, judging from his figure, to refer to a somewhat broader state of *D. tenuifolia*, our var. *β*. Of *D. Chusana* I am doubtful also.

84. D. *clavata*, Sw.; caudex creeping lanate with dark brown articulated hairs, stipes erect elongated pale straw-colour, frond erect ovato-lanceolate rather short lax submembranaceous tripinnate, the segments or pinnules distant ultimate ones very narrow linear-cuneate simple or forked glabrous, the apex sharply inciso-dentate, rachis compressed slightly winged, involucre terminal subrotund transverse often erose. — *Sw. Syn. Fil. p.* 133. *Willd. Sp. Pl.* v. *p.* 478. Adiantum clavatum, *L.* — Adiantum minus, foliis in summitate retusis, *Plum. Fil. t.* 101, B. — Davallia venusta, *Schk. Fil. p.* 122, *t.* 128. *Kze. in Pl. Crypt. Poepp. in Linnæa*, ix. *p.* 87. D. tenuifolia, *Poepp.* "*Fil. Exsicc. Cub.*" (*Kze.*)

Hab. West Indian Islands, Martinique, *Plumier;* Cuba, *Poeppig;* Bahamas, *Swainson.* Jamaica, *Wiles, Mc Fadyen, Purdie* (White-Hall, St. Thomas' in the East).—Quite distinct from *D. tenuifolia,* and apparently peculiar to the new world (and confined to the tropical islands) as the latter is to the old world. It is usually smaller than *D. tenuifolia,* far more slender, and delicate, of a much paler colour, with very elongated narrow-cuneate or rather clavate segments. The ordinary height is a foot (of which the stipes is about half); but Mr. Purdie's specimens are two feet long and exceedingly graceful. Schkuhr's figure, above quoted, is very good, and it is strange that it should ever have been quoted as *D. tenuifolia.* Plumier's figure is characteristic, though coarse and the segments too broad.

85. D. *retusa,* Cav.; erect, frond ample decompoundly pinnate, pinnæ much acuminate, pinnules rhomboideo-lanceolate tapering into a short petiole sometimes again pinnate below, ultimate pinnules or segments broadly cuneate entire or bi-trifid many-nerved, sori at the truncated apex generally confluent so as to form a transverse linear involucre (resembling that of *Lindsæa*). (TAB. LII. A.)—*Cav. Præl. n.* 692. *Sw. Syn. Fil. p.* 133. *Willd. Sp. Pl.* v. 476. *J. Sm. En. Fil. Philipp. l. c. Pr. Reliq. Hœnk.* vi. *p.* 66.

Hab. Philippine Islands, (*Cavanilles*); Luzon, *Cuming, n.* 411.—A tall growing species, but not scandent, much branched, at least four times pinnate. Pinnules large, from the confluence of several lobes. The fructifications, if viewed from beneath, exactly resemble those of *Lindsæa:* but on the back of the segment, the substance of the frond itself will be seen to extend to the apex. The rachis is glossy chestnut brown: the frond deeper brown, opaque and rather paler beneath.

86. D. *bifida,* Hook. and Grev.; rather small, roots tufted, caudex obsolete, stipes erect, frond ovate or deltoid membranous tender bright green tripinnate, ultimate pinnules bifid or bipartite all of them linear cuneate glabrous truncate and erose at the apex, sori terminal or nearly so, involucres transversely oblong entire.—*Kaulf. Enum. Fil. p.* 222. *Hook. et Grev. Ic. Fil. tab.* 238.

Hab. Brazil, *Chamisso;* Minas Geraes, *Langsdorff (in Herb. nostr.)* Organ mountains, *Gardner, n.* 155; St. Catherine's, *Macrae.*—An elegant and very graceful species, with the delicate appearance and rich green of some *Trichomanes,* which also the narrow divisions of the fronds resemble. Sprengel refers to this species "*Lindsæa virescens,* Sw.;" I know not upon what authority, nor where that name is published.

87. D. *Goudotiana,* Kze.; small, caudex slender creeping, frond oblong-lanceolate acuminate membranaceous pinnate, pinnæ nearly sessile deeply bi-subtripinnatifid, the segments narrow cuneate simple or bifid obtuse with a simple or forked vein, sori terminal often with a tooth of the frond projecting on the outside, involucre subreniform, stipes short

slender. (TAB. L. C.) β. pinnæ scarcely more than pinnatifid, segments larger and broader. D. Goudotiana, *Kze. Anal. Pterid. p.* 35, *t.* 22, *f.* 2.

Hab, Madagascar, at Emirne, *Dr. Lyall.* β. Madagascar, *Goudot.*—My specimen which I had called *D. Emirnensis*, MSS. is unquestionably the same species with *D. Goudotiana*, Kze., and being more compound, it is probably the more fully developed state: hence I have been led to consider Kunze's plant as the variety. It is an extremely distinct species and probably very rare.

88. D. *Schlectendahlii*, Pr.; frond ample spreading 3—4 pinnate subrigid, primary pinnæ spreading or deflexed, secondary and pinnules dichotomously divided divaricating distant the segments narrow linear single-veined slightly dilated upwards (hence cuneate) grooved on the underside, rachis 4-sided and as well as the main rachis everywhere zigzag, sori terminal solitary, involucres broad ovate or obovate the apex free forming with the apex of the segment two rounded lips. (TAB. LIV. C.)—*Presl, Tent. Pterid. p.* 129 (*name only*). D. divaricata, *Schlecht. in Linnæa*, v. *p.* 617 (*not Blume*). *Martens and Galeotti, Syn. Fil. Mex. p.* 77.

Hab. Mexico, *Schiede and Deppe:* Slate district, east of Oaxaca, 3—5000 feet of elevation, *Galeotti*, (*n.* 6372).—A singular, and apparently a somewhat scandent, Fern, copiously and deeply divided into very narrow, divaricating, rather rigid segments, deep brown in colour. Here the fructification, though truly that of a *Davallia*, puts on the appearance of that of an *Hymenophyllum*, so much does the apex of the segment of the frond resemble one of the lips of an involucre, to which the involucre itself is parallel. The segments are as narrow as those of *D. Blumeana* (supra, p. 177), but the composition of the frond and the sori are quite different.

89. D. *meifolia*, H. B. K.; "fronds tripinnate glabrous, pinnules bipartite, segments cuneate, sorus subrotund terminal, sterile ones emarginate or bifid." *H. B. K. Nov. Gen. Am.* i. *p.* 23. *Presl, Reliq. Hænk.* i. *p.* 67. Darea fumarioides, *Willd. Sp. Pl.* v. *p.* 299.

Hab. Caracas and Chacao, *Humboldt.* Panama. (*Presl*).—With this I am unacquainted: and neither of the authors who have described it alludes to its affinities. Mr. J. Smith considers it may be *D. gibberosa*, Sw.

90. D. *thecigera*, H. B. K.; "fronds at the apex bi- at the base tripinnate glabrous, pinnules linear-cuneate furnished with a rounded sorus beneath the apex, involucres entire, rachis alato-marginate." *H. B. K. Nov. Gen. Am.* i. *p.* 23.

Hab. Province of Venezuela, *Humboldt.*—May not this, which is unknown to me, be a form of *D. clavata?*

91. D. *cuneiformis*, Sw.; "fronds triplicato-pinnate, pinnules subtripartite, segments alternate obovato-cuneate truncated, involucres spreading." *Willd.—Sw. Syn. Fil. p.* 133. *Willd. Sp. Pl.* v. *p.* 477. D. didyma, "*Hedw. Fil. fasc.* 4." Trichomanes cuneiforme, *Forst. Prodr. n.* 469.

Hab. Pacific Isles, *Forster.*—The specimen is so bad in the Banksian Herbarium, that I can make nothing of it.

92. D. *biflora*, Kaulf.; "fronds bi-tripinnate coriaceous, the apex and lower pinnæ caudate, segments cuneiform truncate with about two sori, involucres subrotund." *Kaulf. En. Fil. p.* 221.

Hab. Manilla, *Chamisso.*—"Differs from *D. cuneiformis*, Sw. in the coriaceous frond with wider segments, the involucres subrotund entire."

Doubtful Species of this division.

93. D.? *triloba*, Willd.; "fronds pinnate, pinnæ alternate petiolate tripartite, segments subrotundo-obovate" (cuneate) "obtuse inciso-crenate." *Willd. Sp. Pl.* v. *p.* 468. Adiantum trilobum, *L.*—Ad. humile trifoliatum et repens, *Plum. Fil. p.* 82, *t.* 99, *f.* C.

Hab. Hispaniola, *Plumier.*—This and the following are taken up by Willdenow solely from the figures of Plumier: but whatever may be the genus of those, the present would seem to belong to *Adiantum*, if Plumier's description may be depended upon.

94. D.? *trifoliata*, Sw.; "fronds bipinnate, pinnules ternate sessile very narrow linear truncate, rachis flexuose." *Willd.—Sw. Syn. Fil. p.* 133. *Willd. Sp. Pl.* v. *p.* 478. Adiantum trifoliatum, *L.*—Adiantum triphyllum et retusum, *Plum. Fil. p.* 81, *t.* 99, *f.* B.

Hab. Hispaniola, *Plumier.*—A fern with the slender pendent habit of some *Trichomanes*. The real nature of the sori is unknown.

95. D.? *capillacea*, Willd.; "fronds triplicato-pinnate, pinnules filiform terminated by a sorus." *Willd. Sp. Pl.* v. *p.* 479. Trichomanes capillaceum, *L.*—Adiantum capillaceum, *Plum. Fil. p.* 83, *t.* 99, *f.* D.

Hab. Hispaniola, *Plumier.*—May this not be an indifferent figure of *Trichomanes trichoideum?*

96. D. *thalictroides*, Pr. Tent. Pterid. l. c. (name only).

97. D. *flexuosa*, "Spr. in Sieb. Fl. Mart. Suppl. n. 23." Pr. Tent. l. c. (name only).

** *Fronds very long, scandent, spinous.*

98. D. *aculeata*, Sw.; fronds spreading ample scandent subtriplicato-pinnate firm subcoriaceous, lower pinnæ tripinnate ultimate pinnæ lanceolate, pinnules flabellato-cuneate

unequally bi-trifid the lobes broad cuneate 2—4-veined, rachis wiry flexuose or zigzag prickly with curved spines, involucres terminal rather small cup-shaped or half oval not confluent less than the diameter of the segment. (TAB. LIV. B.)—D. aculeata, *Sm. in Act. Taur.* 1793. *Sw. Syn. Fil. p.* 134. *Fl. Ind. Occ.* iii. p. 1699. *Willd. Sp. Pl.* v. *p.* 479. D. dumosa, *Sw. Syn. Fil. p.* 135 and 353. *Willd. Sp. Pl.* v, p. 486, (*not Kunze*). Adiantum aculeatum, *L.* "*Spreng. Anleit.*"—Adiantum frutescens, spinosum et repens, *Plum. Fil. p.* 77, *t.* 94.—*Sloane, Jam.* i. p. 99, *t.* 61.

Hab. West Indian Islands, *Menzies.* Hispaniola, *Plumier.* Jamaica, *Swartz, Dr. Bancroft.* Dominica, *Dr. Imray, n.* 7.—This has all the appearance of a large climbing Fern. The caudex, Plumier tells us, "is no thicker than a writing pen, but it extends in every direction by means of long branches, which are as hard as wood and quite black and woolly. Fronds are produced from this caudex of prodigious length, with their stipes and rachis polished like ebony, and beset with hooked spines: from these spring long branches, sometimes alternate, sometimes opposite, waved and tortuous; from each bend or angle a branch proceeds, beset with pinnules or leaves resembling those of the Maiden-hair," *Adiantum Capillus.* "The whole plant, however," continues Plumier, "resembles a *Rubus* rather than an *Adiantum*, in consequence of its spiny character. It occupies a great quantity of surface and invests the largest forest-trees if growing near them. I have seen a whole field entirely covered with this Fern, in a place which the Buccaneers call 'Spiny bottom.' The same Buccaneers call the plant the *French Fern.*"—By its broader pinnules and segments this plant seems to bear the same relation to *D. fumarioides*, that *D. retusa* does to *D. tenuifolia.*

It will be seen that I have differed from all my predecessors in uniting the *D. dumosa* with *D. aculeata.* For the *D. aculeata* the authority is Sloane's figure, which is sufficiently characteristic. The *D. dumosa* is a species wholly taken up from Plumier, whose figure is equally satisfactory, if we only make allowance for a little exaggeration in the spines of our plants. Sprengel seems to have been the first to consider Plumier's plant distinct, and to have misled the excellent Swartz, who in the Flora Ind. Occ. correctly enough referred to Plumier's figure for *D. aculeata*, which in his Synopsis Filicum he has removed to *D. dumosa*, in which work however he has under both species included the *Adiantum aculeatum*, L.: and, so conscious was he of the similarity of the two, that he observes, under *D. dumosa*, "simillima *D. aculeatæ* toto habitu, ita ut non valde miror Cel. Sprengelium l. c. hanc pro illam habuisse."

99. D. *fumarioides*, Sw.; fronds spreading ample scandent subtriplicato-pinnate firm submembranaceous, lower primary pinnæ 3—4-pinnate, pinnules ovato-lanceolate deeply bipinnatifid, segments cuneate digitated, the segments linear-cuneate obtuse single-veined, rachis wiry flexuose or zigzag prickly with decurved spines, sori solitary terminal, involucres cup-shaped or half-oval as broad as the segment.—*Sw. Syn. Fil. p.* 135. *Fl. Ind. Occ.* iii. *p.* 1701. *Schkh. Fil. t.* 129 (*excellent*). *Willd. Sp. Pl.* v. *p.* 480. D. aculeata,

"*Hedw. Fil.*" (*according to Willd.*) Trichomanes aculeatum, *Sw. Prodr. p.* 137. Acrostichum aculeatum, *L.* Davallia dumosa, *Poepp. Fil. Cub.* (*in Herb. Hook.*) *and Kze. Crypt. Poepp. in Linnæa, p.* 88.* (*not Sw.*)

Hab. West Indian Islands. Jamaica, *Sloane, Swartz, Menzies, Wiles, McFadyen;* Cuba, *Poeppig.*

Subgenus IX. DAREOIDEÆ. *Sori lateral or sublateral, and more or less oblique upon a more or less dilated terminal segment. Involucre always close to the margin, broader than long, terminal upon a vein, somewhat cup-shaped, open only at the truncated mouth and forming a compressed pouch at the edge of the segment, of nearly the same texture as the frond.—Tropical or subextratropical Ferns, of the Old and the New World. Root tufted, fibrous. Stipes linear, compressed, sometimes with a few scattered scales. Fronds a span to a foot or more long, at first pinnate then compoundly pinnatifid, or deeply divided throughout in a bi-tri-pinnatifid manner, into narrow, linear segments, only a little dilated at the apices, everywhere glabrous, opaque, the texture moderately firm (probably rather fleshy when recent), single-veined, the vein sunk, obscure; colour pale green.*

OBS. This is indeed a small though a very natural subgenus; in colour and texture so much resembling the group *Darea* among *Asplenia*, that I have derived the name of the subgenus from that circumstance: and the general obliquity of the sorus, opening towards the margin, strengthens the similarity. The resemblance is the greatest with *Asplenium* (*Darea*) *Shuttleworthianum*, Kze., in Schkuhr's Suppl. t. 14. There however the involucres are more elongated and are more decidedly lateral.

100. D. *gibberosa*, Sw.; frond ovate bi-subtripinnate subcoriaceous opaque, pinnæ acuminate deeply bipinnatifid, segments rather distant linear dilated at the apex simple or obliquely bifid gibbous on one side 1-veined, sorus on the oblique dilated apex of a segment with generally a tooth of the segment on the outside, involucre cup-shaped of nearly the same colour and texture as the frond.—*Sw. Syn. Fil. p.* 134 *and* 351. *Schkh. Fil. p.* 121, *t.* 128 (*very accurate*). *Willd. Sp. Pl. v. p.* 476. Trichomanes, *Forst. Prodr. n.* 470. Davallia glaucescens, "*Hedw. Fil.*"

Hab. Pacific Islands, *Banks, Nightingale.* Otaheite, *Beechey.* Pitcairn's Island, *Cuming, n.* 1373.—The tallest of this group, and, in the lower part at least, twice or thrice pinnated, then pinnatifid. Stipes and main rachis less compressed than in most of the species and of a darker colour.

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* Presl quotes *D. dumosa*, Kze., and *D. dumosa* and *D. fumarioides*, Poepp. Pl. Exsicc., under *D. aculeata*, Sw. My specimen of *D. dumosa*, from Poeppig, is unquestionably, as I have above stated, *D. fumarioides.*

Fronds 1½ to 2 feet high. Fructifications copious, one on almost each dilated apex of a segment, in a sinus of two unequal lobes, of which one is gibbous. The involucre is oblique, and opens towards the axis of the pinnules.

101. D. *Lindeni*, Hook.; tufted, root fibrous but having a short thick rootstock, fronds (a span long) ovato-lanceolate bipinnatifid pale green, primary divisions lanceolate in circumscription, ultimate ones remote and rachis linear, the forms dilated upwards blunt and bearing the sorus obliquely in the inner margin, involucres cup-shaped compressed truncated generally with a short blunt falcate tooth on the outer margin formed by a prolongation of the segment, stipes longer than the frond compressed narrow-linear green, and as well as the frond bearing scattered brown at length deciduous subulate scales. (Tab. LVI. B.).—*β.* smaller segments narrower, apices of the segments more acute.

Hab. Caracas, *Linden*, *n.* 70; *Hartweg*, *n.* 1507; *Funck*, *n.* 648.—*β.* Organ mountains, on the stem of an old tree, *Gardner*, *n.* 200.—Very distinct from the preceding, and more allied to the following, from which it may be known by its smaller size, of a darker green, with more slender (yet decidedly compressed) stipes, shorter fronds, broader, with more distant segments and oblique sori, in which latter respects it approaches to *D. gibberosa*. Our var. *β.* from Brazil is more slender, with narrower segments, the ultimate ones more acute: but I see no other differences.

102. D. *Schimperi*, Hook.; tufted (a foot high), root fibrous, fronds pale whitish green lanceolate with scattered brown deciduous scales, tripinnatifid, segments linear distant dilated at the apex and obtuse simple or forked on the lower ones sometimes pinnatifid, sori terminal solitary slightly oblique, involucres cup-shaped truncate rarely (the inferior ones) with a tooth on the outside, stipes shorter than the frond linear flat as broad as the segments with small scattered distant scales. (Tab. L. A.).—D. concinna, *Schimper, It. Abyss. Sect. 2da, n.* 1184, "*specimina maxima*," (*not Schrad.*)

Hab. Trunks of trees near Adesula, Abyssinia, *Schimper*.—This is a very different plant from the following, *D. concinna*. Its roots are tufted and fibrous, but in the centre of the fibres is a short cormus or root-stock, with some dark brown, glossy scales. Stipites crowded, several from the same root, linear, pale, almost white, flattened, with a few scattered dark brown scales, which are probably deciduous. Fronds a span and more high, lanceolate, bipinnatifid: primary segments or divisions lanceolate in circumscription, ultimate ones distant, and rachis of the same width as the stipes. Involucres terminal, solitary, a little oblique on each segment, slightly winged on each side, truncated.—Allied to *D. gibberosa*, but truly distinct, everywhere pinnatifid. Color very pale.

103. ? D. *concinna*, Schrad.; "frond lanceolato-oblong

obtuse curved thick coriaceous glabrous above, beneath with scattered brown scales, more or less deeply pinnato-pinnatifid, pinnæ alternate patent ovate cuneate at the base, segments linear-spathulate curved bordered, the margin thickened reflexed retuse bi- or trifid, sori and involucres large semiorbicular, rachis flattened costate margined, stipes short ascending, caudex creeping densely clothed with brown rigid scales." *Kze.*—" *Schrad. Fil. Cap. in Goett. Gel. Anz.* 1818, *n.* 92, *p.* 918, *not Presl.*" * *Kze. Emend. ad Acotyl. Afr. Austr. in Linnæa*, xiii. *p.* 152, *et in Schk. Fil. Suppl. p.* 75, *t.* 37. D. campyloptera, *Kze. Acot. Afr. in Linnæa*, x. 544.

Hab. Interior of South Africa, *Drège*, *Krauss*, *n.* 742. — With this species I am not acquainted, and I am probably wrong in referring it to this subgenus: but I am induced to do so from the circumstance of Schimper having considered his plant, just described (*D. Schimperi*, nobis), to be a large state of it. It has not the habit, nor apparently the fructification, of this group.

Species of the Genus altogether doubtful.

104. D. *glauca*, Cav.; "leaves tripinnate, pinnules alternate glaucous, pinnules linear pinnatifid acute." *Cav. Præl.* 1801, *n.* 693. *Sw. Syn. Fil.* 134. *Willd. Sp. Pl.* v. 474.

Hab. Alps, Peru (*Cavanilles*). Probably not of this genus.

105. D. *hirsuta*, Sw.; "fronds subbipinnate pubescent, pinnules coadunate lanceolato-falcate crenated towards the apex." *Sw. Syn. Fil. p.* 131 *et* 243. *Willd. Sp. Pl.* v. 469. Trichomanes hirsutum, *Thunb. Jap.* 339, (*non Linn.*)

Hab. Japan, *Thunberg.*

106. D. *Magellanica*, "Desv.; frond glabrous, pinnules oblong lower ones sinuato-pinnatifid, upper ones toothed at the apex, sori scattered." *Spr. Syst. Veget.* iv. 120.

Hab. Magalhaens, (*Desvaux*). — A very unlikely country for any true *Davallia.*

107. D. *pellucida*, Desv.; "pinnæ and pinnules acute, pinnules decurrently pinnate, ultimate pinnules glabrous ovato-oblong deeply toothed at their apex, teeth somewhat subulato-setaceous, rachis distantly divided, stipes glabrous." *Desv. in Mem. Soc. Linn. Par.* ii. 346.

(D.? *lobata*, Desv. is the *Lindsæa lobata* of Poiret, of the genus of which Desvaux seems to be doubtful. — With such names the present catalogue of dubious species might be increased *ad infinitum*).

* Which is *Dicksonia* (Patania) *concinna*, supra, p. 74.

108. D. *urophylla*, Wall. Cat. n. 2683; from the mountains of Sylhet, I have not been able to find in my own, nor in any other collection.

109. D. *cordifolia*, Roxb.; "creeping, petioles smooth, fronds about 6 inches high long-cordate polished and very firm oppositely pinnate, leaflets confluent falcate obtuse deeply crenate the lower pair semicordate, fructifications marginal with very distinct roundish hard scaly involucres." *Roxb. Crypt. Pl. Ind.* 52.

Hab. Mountains north of Rohilcunde, *Roxburgh*. "The habit of this species is remarkably hard and smooth."

110. D. *serrata*, Roxb.; "rachis 3-sided, fronds alternately pinnate, leaflets linear firm and smooth serrate, fructifications solitary at each serrature, involucre forming a small pouch after the capsules expand." *Roxb. l. c.* 52.

Hab. Prince of Wales' Island, *Dr. Roxburgh*.

111. D. *pilosa*, Roxb.; "fronds alternately bi- and tripinnate hairy, leaflets deeply crenate or pinnatifid, ultimate segments therefore semicircular somewhat crenulate and generally 3-flowered, involucre ciliate and separating outwards." *Roxb. l. c. p.* 53.

Hab. Eastern parts of the Delta of the Ganges, and thence introduced by Dr. Buchanan to the Calcutta Botanic Garden, *Roxburgh*.

112. D. *trapeziformis*, Roxb.; "stipes smooth nearly as long as the ovate-oblong alternately bipinnate and tripinnatifid fronds (1—2 feet high), leaflets subtrapeziform obtuse and more or less divided into rounded segments, fructifications generally in a single spot near the bottom of the fissures of the ultimate segments, involucre opening on the anterior margin forming a pouch." *Roxb. l. c. p.* 54.

Hab. Malaccas, *Roxburgh*. "Of a soft texture, tending to be villous."

(D. *angustifolia*, Roxb. l. c. p. 51, is *D. angustata*, Wall. (et nob. supra, p. 152), according to Griffith).

D. *multiflora*, Roxb. l. c. p. 53, is *D. parallela*, Wall. (et nob. supra, p. 153) according to the same authority.

D. *longifolia*, Roxb. l. c. p. 52, is probably *D. Emersoni*, Hook. et Grev. supra, p. 159.

(D. ? *achillæifolia*, Wall.; caudex ? flagelliform extremely long, semiterete branched stout creeping here and there woolly rooting spinescent, fronds distant alternate from two opposite sides of the caudex (?) bipinnate, pinnæ articulated

on the rachis oblong horizontally patent, the rachis winged, pinnules submembranaceous cuneate subdigitate unequally bi- or trifid, the segments cuneate, involucres ——— ? TAB. LVI. D.).—Davallia achillæifolia, *Wall. Cat. n.* 248.

Hab. Penang, *Dr. Wallich.* — Caudex, if it may be so called, perhaps, more correctly, creeping stipes, many feet long, as thick as a swan's quill, flexuose, branched but compressed or slightly channelled on the underside, destitute of scales, but furnished with short, distant, slightly curved spines on the convex or semiterete side. Fronds (or primary pinnæ) small, 4—5 inches high, almost sessile, narrow-ovate, submembranaceous. Pinnæ opposite or alternate, jointed on the rachis and deciduous, oblong-lanceolate, pinnatifid (or pinnate with a winged rachis), the segments or ultimate pinnules small, cuneate in the undivided ones, subflabellate in those which are twice or thrice lobed; the lobes with a single vein. There are small dark-colored deciduous scales scattered on the fronds and rachis.

The above description, together with our figure, TAB. LVI. D., will give a tolerably correct idea of this singular Fern, or state of a Fern; for Mr. J. Smith has pointed out to me in his collection a specimen he received from Professor Reinwardt of Leyden, under the name of *Lomaria polymorpha* (*Lomaria aculeata*, Bl. En. Fil. p. 205), which appears almost identical with this. Blume, however, places it among his doubtful *Lomariæ*, and it seems to be the state he alludes to as "*var.* B. laciniis cuneatis bitrifidis." Mr. J. Smith, too, finds a similar production on specimens of his *Stænochlæna* (*Acrostichum*, L.) *scandens*, from Mr. Cuming, which he has fully described in his Enum. Fil. Philipp. in Hook. Journ. of Bot. iii. p. 401, where he remarks "these abnormal fronds are usually about 3 inches in length and tripinnatifid, not unlike some delicate multifid species of *Davallia* or *Cheilanthes*. They are found on a lengthened rachis, like parts of the rhizoma, which are either smooth or aculeated. From Mr. Cuming's authority and Reinwardt's specimen, there can be now no doubt that it is a peculiar growth, common to more than one species of this genus. I am not, however, in possession of sufficient evidence to enable me to state under what circumstances it takes place, although, probably, I am not far wrong in saying that it may be considered analogous to the trichomanoid growth found on the stipes of *Hemitelia* (*Alsophila*) *Capensis*," (v. supra, p. 37). — In this view of the subject I heartily concur: it will probably be found that the supposed caudex is a stipes, and the supposed reduced and altered fronds are rather pinnæ than fronds).

2. CYSTOPTERIS, *Bernh.*

Polypodii, sp. *Linn.* Aspidii sp. *Sw. and others.* Nephrodium, *Mich.* Cyathea *et* Cystea, *Sm.* Athyrium, *Roth.*

Sori globose, situate at the middle of the back of a veinlet. *Involucre* superficial, thin, membranous, cellular, subglobose, cucullate, more or less acuminated and often jagged, inserted by its broad, inflated base under the sorus (often a little obliquely), and covering that sorus; its apex directed to the apex of the segment; at length often reflected.—*Tufted* Ferns; *or the* caudex *sometimes creeping; chiefly in-*

habiting temperate climates both of the old and new world, and both hemispheres. Fronds *generally small, delicate, membranaceous, bi-tripinnatifid or pinnate.* Veins *pinnate and forked,* veinlets *free, terminating a little within the margin.*

Obs.—A genus founded on the well-known *C. fragilis,* whose fructification has been viewed by authors in very different lights, hence the copious list of synonymous genera: and it must be confessed that the smallness of the fructification, together with the very delicate succulent nature of the involucre when fresh, membranous when dry, soon becoming revolute and shrinking, has occasioned much of the difficulty. The few species which it contains are found to be extremely variable, and they have been needlessly multiplied; while on the other hand species have been added which clearly have no connexion with it. Confined to its legitimate species it is a very natural genus, and may assuredly be considered a connecting link between the *Davalliaceæ* and *Aspidiaceæ,* harmonizing better with the former than with the latter, especially with that group, or subgenus, as it is here called, of *Davallia, Leucostegia.* The involucre forms a kind of cup at the base, holding, as it were, in the young state, the sorus, and having a broad point of attachment. On account of the affinity with *Davallia,* I place the genus between that and *Lindsæa,* some of whose species, as has been already intimated, bear also a close affinity to *Davallia.*

1. C. *fragilis,* Bernh.; fronds broad lanceolate bipinnate, pinnæ ovate or lanceolate variously toothed or laciniated or pinnatifid the segments more or less acute entire or again toothed, sori scattered more or less distant sometimes crowded and almost confluent, rachis winged.

a. *vulgaris;* fronds decompound pale green, sori rather large generally crowded, involucres usually acuminated conspicuous.

Cystopteris fragilis, *Bernh. Neu. Journ. Bot.* ii. *p.* 27. Polypodium, *L.* Aspidium, *Sw. Willd. Sp. Pl.* v. *p.* 280. *Schkh. Fil. t.* 54 (*excellent*), *and vars. tt.* 55, 56. Cyathea, *Sm. Engl. Bot. t.* 1587. Cyathea, *Sm. Eng. Fl.* iv. *p.* 289. C. orientalis, *Desv.*

Hab. (a.) Rocks and walls, chiefly in northern or alpine regions throughout Europe. Kamtschatka, (*Herb. nostr.*) Iceland, *Hooker.* Abyssinia, *Schimper.* — N. America, from the middle states to the Polar sea: among the Rocky Mountains, and both on the Pacific and Atlantic sides of that continent. Madeira, *Mund* (*Herb. Carmichael*), *Lowe and others*). Northern India, Affghanistan, *Griffith.* Kaffre country, Cape of Good Hope, *Ecklon.*

The type of this species, which I here call a. *vulgaris*, is familiar to every European botanist, and scarcely less common in moist mountain rocks in N. America; but no one can have seen an extensive suite of specimens, from the same or from different localities, without being aware of the varied aspect it exhibits. In South America it assumes rather a different character from the European plant, chiefly however depending on colour, whence it may be called

b. *nigrescens;* fronds as in a, but when dry generally becoming dark olive or blackish.

Cystopteris fumarioides *of some authors* (*scarcely of Presl*). C. translucens, *Desv.* Aspidium fragile, *Mart. et Galeot. Fil. Mex. p.* 67.

Hab. Andes of Peru, *Maclean*, and Puruchucha, *Mathews*, *n.* 601. Columbia, *Hartweg*, *n.* 1526; Pasco, *Cruckshanks* (*small and approaching* C. dentata). Quito, *Jameson.* Guatemala, *Skinner.* Peak of Orizaba, Mexico, *Galeotti*, *n.* 6239.

c. *dentata*; fronds bipinnate, pinnæ ovato-lanceolate, pinnules ovate obtuse bluntly and unequally toothed rarely pinnatifid.

Europæan and Northern Asiatic Synonyms.

Cystopteris dentata, *Hook. Brit. Flor. ed.* 5, *p.* 441. Aspidium, *Sw. Willd. Sp. Pl.* v. *p.* 273. Cyathea, *Sm. Eng. Bot. t.* 1588. Cystea, *Sm. Engl. Fl.* iv. *p.* 300. Polypodium dentatum, *Dicks. Crypt.* iii. 1, *t.* 7. P. Rhæticum, *Dicks.* Cyathea fragilis, *β. Sm. Fl. Brit. p.* 1139. Cyathea angustata, *Sm. Eng. Fl.* iv. *p.* 301. Cystopteris Canariensis, *Pr.* Aspidium, *Willd. Herb.* Aspidium Pontederæ, *Willd. Sp. Pl.* v. *p.* 273. Cystopteris retusa, *Decne. in Jaquem. Voy. Bot. p.* 176, *t.* 177.

North American Synonyms.

Cystopteris tenuis, *Schott.* Aspidium tenue, *Sw. Willd. Pl.* v. *p.* 279. *Schk. Fil. t.* 53 *b*, (*excellent*). Nephrodium tenue, *Mich.* Cystopteris fragilis, *β. Hook. Fl. Bor. Am.* ii. *p.* 260. C. atomaria? *Muhl. Willd. Sp. Pl.* v. *p.* 279.

South American Synonyms.

Cystopteris fumarioides, *Kze. in Poepp. Fil. p.* 97. Athyrium, *Presl, Reliq. Hænk. fasc.* i. *p.* 39, *t.* 6, *f.* 2. Cyst. fragilis, *Kze. in Poepp. Fil. p.* 97 (*according to a specimen from Poeppig*). Aspidium fragile, *var.* fumarioides, *Mart. et Galeotti, Fil. Mex. p.* 67. Aspidium colobodon, *Kze. in Colla, Pl. Chil.* i. *n.* 265, (*fide Kze:*) Cyst. Jamaicensis, *Desv.*

Hab. Europe, (and N. India and N. African Islands). N. of England, Wales and Scotland. Iceland, *Hooker.* Norway, (*Herb. Hook.*) Cashmere, about Hirprom, *Jacqem.* Madeira, *Dr. Finlay, Lowe.* Canary Isles (*Desvaux*), *Dr. Finlay.* Fayal, in the Azores, *Dr. Guthnick.* Greenland, *Hornemann.*—North America. Kentucky to the Arctic regions, and from the Atlantic to the Pacific. — S. America and W. Indies. Jamaica, *Dr. Wright.* Peak of Orizaba, Mexico, *Galeotti*, *n.* 6260. Chili, *Bridges*, *n.* 551. *Cuming*, *n.* 491. *Poeppig* (*in Herb. nostr. under the names of* Cyst. fragilis, *and* C. fumarioides). Uspallata and Villa Vincenzia, Andes of Mendoza, *Gillies.*

Such, in our view of the subject, is the range and such the synonyms of this plant, and if it were worth the labour of investigation, the latter might be increased two-fold. Desvaux adds five names of Poiret to the list of synonyms, and among the sixteen species of *Cystopteris*, given as such, by that author, probably several might with propriety be referred to the present.

2. C. *alpina*, Desv.; fronds broad-lanceolate tripinnate, pinnules confluent ovato-oblong pinnatifid rather spreading, the segments broadly and shortly linear obtuse with 2 or 3 blunt erect teeth, involucres short and jagged, rachis winged.—*Hook. Brit. Fl. ed.* 5, *p.* 441. Aspidium, *Sw. Willd. Sp. Pl.* v. *p.* 282. *Schkh. Fil. p.* 60, *t.* 62. Polypodium alpinum, *Jacq. Ic. Rar.* iii. *t.* 642, (*excellent*). Polypodium crispum, *Gouan.* Cystopteris regia, *Pr.* Cystea regia, *Sm. Eng. Fl.* iv. *p.* 302, (*excl. the alpine station*). Cyathea regia, *Sm. Fl. Brit. p.* 1140. Polypodium regium, *Linn.* Aspidium, *Sw. Willd. Sp. Pl.* v. *p.* 281.

Hab. Alps, chiefly in the South of Europe. England; on a wall (since destroyed) at Low Layton, Essex, *T. F. Forster, Esq.* — An elegant bright green species, very different from the preceding, although nearest to some small states of *var.* a, and difficult to be defined in words.

3. C. *Tasmanica*, Hook.; small delicate, stipes short and rachis capillary, fronds oblong pinnated, pinnæ broadly ovate inciso-lobate upper ones decurrent lower ones petiolate and pinnatifid the segments ovate obtuse entire or slightly toothed, sori few very minute, involucre ovate acuminate, rachis winged above.

Hab. Van Diemen's Land, *R. Gunn, Esq.* — I was at one time disposed to refer this to one of the states of the var. *dentata* of *C. fragilis*, but the fact of Mr. J. Smith having received from the same country, though from a different source, an exactly similar plant, together with the delicate habit, large (comparatively) and broad, little divided pinnæ, and minute fructifications, induce me to keep it distinct. Caudex slightly creeping. Whole plant, including the stipes, 4—5 inches high.

4. C. *bulbifera*, Bernh.; frond broad-lanceolate or ovato-lanceolate and elongated bipinnate, primary pinnæ horizontal oblong-lanceolate from a broad base acuminated, pinnules oblong obtuse spreading pinnatifid toothed or pinnatifid, the segments entire or of the base of the lowermost pinnæ almost again pinnatifid, rachis not winged, that of the pinnæ often bulbiferous beneath, involucre subglobose.—Aspidium bulbiferum, *Sw. Syn. Fil. p.* 29. *Schkh. Fil. p.* 55, *t.* 57, (*excellent*). *Willd. Sp. Pl.* v. *p.* 275. Polypodium, *L.* Nephrodium, *Mich. Am.* ii. *p.* 268.

Hab. N. America, chiefly in the middle United States and Canada. — I have not seen this from a locality further south than Kentucky, except in one instance, from Virginia (*Mr. Greene*), nor further north than about

Quebec and Montreal. It is a most distinct species, with rather a stout, glossy, pale-coloured stipes and rachis, a remarkably elongated frond (sometimes 2 feet or more long), the pinnæ short, spreading horizontally, frequently opposite, and the pinnules again spreading at right angles, or nearly so, with their rachis, and that rachis often producing large, dark green, fleshy bulbs beneath, especially near the axil, which are well represented in Schkuhr.

5. C. *montana*, Link; fronds triangular short on a long stipes tripinnate, pinnæ and pinnules spreading ultimate pinnules narrow oblong inciso-dentate or pinnatifid, the segments toothed at the apex, rachis not toothed, involucre subrotund very obtuse.—Aspidium, *Sw. Willd. Sp. Pl.* v. *p.* 286. *Schkh. Fil. p.* 61, *t.* 63, (*excellent*). Polypodium, *Haenke.* P. myrrhidifolium, *Vill. Delph.* iii. *p.* 851, *t.* 53.

Hab. Alps of the middle and south of Europe, but more frequent in the north, in Lapland, and in Norway very abundant. Only a single station has been discovered of it in Britain; on Ben Lawers, one of the Breadalbane mountains in Scotland, *Mr. Wilson.* Rocky mountains in N. America, *Drummond.* — A species well distinguished by its small triangular fronds and long stipes. The caudex is long, creeping, filiform, scaly, the stipes red-brown, scaly below.

6. C. *crenata*, Fries; "fronds triangular tripinnate, pinnules oblong obtuse subduplicato-crenate hairy beneath towards the apex acute confluent by the decurrent base, sori oblong, stipes chaffy."—*Fries, Novit. Fl. Suec. p.* 165. Aspidium crenatum, *Sommerf. in Vet. Ac. Handl.* 1834, *p.* 104.

Hab. Gulbrandsdal, Sweden, *Sommerfelt.*—"Very rare, and a most distinct species of this genus, differing in the form of the sori nearly as *Aspidium Filix-fœmina* does from its congeners. A soft, delicate, marcescent, pale green Fern, 2 feet high. Stipes slender, fragile, glabrous, paleaceous, with blackish brown distant scales. Frond more than a foot long, triangular; primary and secondary pinnæ elongated, the outermost ones diminishing in size, thence acute. Rachis of the pinnules winged. The sori upon the lateral nerves oblong, lunate according to Sommerfelt, the indusium opening laterally." *Fries.*—I have reason to think I possess copious specimens of this Fern, with the fructification too young to determine the genus: from the above description however I should have taken it to be an *Athyrium* of Presl.

7. C. *Douglasii*, Hook.; fronds rather small oblong-lanceolate firm pinnated, lower pinnæ broad ovate acute pinnatifid, the segments broad-oblong obtuse dentato-serrate, uppermost ones oblong rather obtuse dentato-pinnatifid decurrent and coadunate, sori rather large, involucre broad roundish much reflected and concealed by the enlarged sorus.

Hab. Sandwich Islands, *D. Douglas*, *n.* 51, of sets distributed by the Horticultural Society of London.—I have only seen three specimens of this plant, without caudex: the largest of them not a span high. Stipes short, naked. Frond firm and rather rigid, approaching to coriaceous, of a dark

blackish color. The form of the pinnæ and segments approaches that of *C. bulbifera*, but they are broader, and much less divided. The fructification, though old, is clearly that of a *Cystopteris*.

8. C. *albescens*, Link; "frond tripinnatifid its outline lanceolate, pinnules oblong inciso-pinnatifid crenulate with minute hairs on the superior surface attenuated at the base."—*Link, Fil. Hort. Berol. p.* 47.

Hab. Iceland? (*Link*).—"Fronds scarcely 3 inches high, pinnæ about 6 lines long, lower ones inciso-pinnatifid, upper undivided confluent; sori few lateral."—Of this I know nothing. The learned author compares it with *Hymenocystis*, Mey., but the "sori are not surrounded on all sides by the involucre."

9. C. *squamata*, Decne.; "fronds tripinnate on both sides as well as the stipes and rachis glabrous, pinnæ stipitate ovate or ovato-oblong, pinnules ovate towards the apex pinnatisected, the segments rather obtuse, involucre small roundish, capsules stipitate, sori verrucose, rhizoma creeping scaly, scales ovate peltate brownish."—*Decne. in Jacquem. Voy. Bot. p.* 178.

Hab. Cashmere, between Carli and Candahar, *Jacquemont*.—The above character, quoted from the Voyage of Jacquemont, is all we know relative to this plant, and is quite insufficient for its determination.

Doubtful Species, together with some that can be referred to other Genera.

C. *obtusa*, Presl, is *Woodsia obtusa* of this work, p. 62, (Aspidium obtusum, *Willd.*)

C. *obovata*, Pr. — The author gives this as the *Asplenium obovatum* of Viviani, and as such it is figured in Hook. et Grev. Ic. Fil., with the true fructification of an *Asplenium*.

C. *atomaria*, Pr. (Aspidium, *Muhl. et Willd.*)—I have quoted this doubtfully under *C. fragilis*, β. *dentata*; but I must acknowledge that I have never seen any authentic plant under that name, and can only judge from the locality and the description. I think Willdenow would have included it under his *Aspidium tenue*, had he been acquainted with that species at the time he received the specimens and name from Muhlenberg.

C. *emarginata*, Pr. Tent. Pterid. p. 93; name only.

C. *leptophylla*, Pr. (Lonchitis tenuifolia, *Beyrich's Herb.*) As Beyrich's plants were, I believe, chiefly from N. America, this will probably prove one of the many varieties of *C. fragilis*. Name only given.

C. *atrovirescens*, Pr. (Cystopteris sp. *Hort. Bot. Berol.*) Name only.

C. *vestita*, Pr. (Dicksoniæ sp. *Herb. Bras. Reg. Berol. n.* 118.)—This, judging from an authentic specimen received from Dr. Klotzsch, is the *Woodsia incisa* of Gill. and Hook. et Grev. Ic. Fil. t. 191. (See p. 63 of the present volume).

C. *odorata*, Pr. (Aspidium odoratum, *Bory*), from Mauritius. My specimen so named from Sieber, and which quite agrees with the description, is doubtless a *Lastræa*.

C.? *Brasiliana*, Pr. (Aspid. Brasilianum, *Br.*) — Name only.

C. *gigantea*, Pr. (Aspidium foliosum, *Wall.*) is *Diacalpe aspidioides*, Bl., and of this work, p. 59.

C. *comosa*, Pr. (Polypodium foliosum, *Wall.*), is *Alsophila comosa* of this work, p. 53.

C. *aspidioides*, Pr. (Dicksonia aspidioides, *Willd. Herb.*) —Name only. An *Diacalpe?*

The *Aspidium viridulum*, Desv. Mag. Nat. Ber. 1811, *p.* 321, (*Polypodium adiantifolium*, Poir. Enc. v. p. 541),—the *Aspidium elatum*, Bory (*Aspid. Boryanum*, Willd.), *Aspid. scandicinum*, Willd., and *Aspid. Javense*, Willd., Desvaux refers to *Cystopteris*, but I know not upon what authority.

Tribe IV. LINDSÆEÆ.

Sori linear, transverse, more or less elongated, interrupted or continuous, marginal, uniting the apices of 2 or more free veins, or of several anastomosing ones. *Involucre* linear, marginal, double, often toothed, opening outwardly; one formed by the margin of the frond more or less scariose, the other accessory, thin, scariose, parallel with it or a little below it, including the *capsules* in the sinus.—*Tufted or generally creeping ferns, tropical, rarely extratropical (in the southern hemisphere).* Fronds *varying in texture, simple or pinnated or variously divided;* pinnæ *and* pinnules *frequently dimidiate.* Veins *dichotomously divided or pinnated or variously anastomosing.* (Hook. Gen. Fil. Tab. LXIII. A. Lindsæa. —Tab. CII. Isoloma, *J. Sm.*—Tab. LXIII. B. Schizoloma, *Gaud.*—Tab. CI. Synaphlebium, *J. Sm.*—Tab. LXII. Dictyoxyphium, *Hook.*)

Obs. — The present group, of which *Lindsæa* is the type, in some of its species borders too closely upon *Davallia*, especially where the involucre is short or frequently interrupted. In its more characteristic form, transverse, long, linear and continuous, the distinction is easily seized, and may be described as formed of a double linear scariose margin, opening outwardly, so that a transverse section represents the letter V, the

anterior or superior one frequently, however, broader than the inferior, the inner one appearing in that case to be intramarginal.

1. LINDSÆA, *Dry.*

Isoloma, *J. Sm.* Schizoloma, *Gaud.* Synaphlebium, *J. Sm.*

Sori marginal, double, continuous or interrupted. *Involucre* opening outwardly, formed of 2 linear membranes, of which the inferior may be considered accessory, uniting the apices of 2 or more veins. — *Tropical* or *subtropical* Ferns, *with frequently a creeping* caudex. Fronds *stipitate, simple or variously divided.* Pinnæ *equal or dimidiate.* Veins *free or simply anastomosing (without veinlets in the areolæ)* Costa *central or excentric, or wanting.* (HOOK. GEN. FIL. TAB. LXIII. A. and B., TAB. CII. and TAB. CI.)

Subgen. I. Eulindsæa. *Veins simple or forked.* Lindsæa *and* Isoloma. *J. Sm.*—Sp. 1—47.

* *Fronds simple.*

1. L. *reniformis*, Dry.; frond simple subcoriaceous orbiculari-reniform with a deep sinus.—*Dry. in Linn. Trans.* iii. *p.* 40, *t.* 7, *f.* 1. *Sw. Syn. Fil. p.* 118. *Willd. Sp. Pl.* v. *p.* 420. *Kze. in Schkh. Fil. Suppl. t.* 16, *f.* 2.

Hab. French Guiana, *Alex. Anderson*, (*Dryander*). British Guiana, *Schomburgk, n.* 533.—Caudex short, creeping. Roots fibrous, wiry. Stipites a span high, somewhat tufted, ebony black. Fronds 2—3 inches in diameter: veins radiating, dichotomous; in one of my specimens 2 branches of the veins sometimes converge, thus anastomosing. Involucre continuous round the whole margin to a little distance from the sinus.

2. L. *sagittata*, Dry.; frond simple submembranaceous broadly ovato-sagittate acuminate.—*Dry. in Linn. Trans.* iii. *p.* 40. *Sw. Syn. Fil. p.* 118. *Willd. Sp. Pl.* v. *p.* 420. *Hook. et Grev. Ic. Fil. t.* 87. — Adiantum &c. *Aubl. Guyan*, ii. *p.* 964, *t.* 366.

Hab. French Guiana, *Aublet.* Guadaloupe, (*Sprengel*). — A very rare species and quite distinct from the preceding one. Fronds more membranaceous, acuminated at the point and at the two deflexed lobes. Involucre everywhere continuous except at the point and the sinus, accessory one distant from the margin.

** *Fronds pinnate.*—Sp. 3—25.

† *Costa excentric or marginal, or obsolete. Sori on the superior margin of the unequal pinnæ.* Lindsæa, *J. Sm.* Sp. 3—22.

3. L. *cultrata*, Sw.; caudex creeping, fronds pinnate long-lanceolate, pinnæ submembranaceous horizontal ovate, the upper base truncate rather acute slightly arcuate at the upper margins the apex (usually) directed upwards, shortly and retusely lobed, the lobes bearing the oblong sori, stipes and rachis generally pale brown, the former occasionally black.—*Sw. Syn. Fil. p.* 119. *Willd. Sp. Pl.* v. *p.* 422. *Schkh. Fil.*

t. 114. *Hook. et Grev. Ic. Fil. t.* 144. Adiantum cultratum, *Willd. Phytogr.* 14, *t.* 10, *f.* 2.

β. *minor;* smaller, pinnæ more obtuse, upper margin especially towards the apex curved a little downwards.

γ. *pallens;* more flaccid, upper margin more lobed, sori more numerous shorter and smaller. L. pallens (*an* Davallia?), *Wall. Cat. n.* 148.

δ. *attenuata;* tall, rather rigid, pinnæ longer and almost acuminated. L. attenuata, *Wall. Cat. n.* 151.

ε. *lucens;* tall, pinnæ very obtuse and soriferous uninterruptedly to the apex, opaque (not pellucid) subcoriaceous glossy. L. lucida, *Wall. Cat. n.* 145, (*not Blume*).

ξ. *Assamica;* pinnæ very obtuse and soriferous to the apex (not glossy) subcoriaceous, sori scarcely ever interrupted.

Hab. East Indies, apparently common, from Bengal (*Wallich*) to Sylhet and Assam, *Wallich*, *Griffith*. Java, *Blume*, *Lobb*. Ceylon, *Mrs. Gen. Walker*, *Mr. Hardie*. Philippine Islands, *Cuming*, *n.* 243.—β. Mergui, *n.* 877, and 96, and Bootan, *Griffith*. Luzon, *Cuming*, *n.* 65, (L. cultrata, *J. Sm.*)—γ. Nepal, *Dr. Wallich*. Sylhet, *De Sylva*, (*Wall.*)—δ. Assam, *n.* 862, and Khasiya, *Griffith*. Chapidong, *Wallich*.—I think I am correct in referring the above to *L. cultrata*, of which the figure in 'Icones Filicum' excellently represents the usual form. The more remarkable states are var. γ. *pallens*, in some specimens of which the upper margin of the pinnæ is so divided, and consequently the sori so interrupted, that there is no wonder Dr. Wallich should be disposed to look upon it as a *Davallia*—scarcely recognizable from *D. Boryana*;—and vars. ε. and ζ. in which the sori are very continuous and extended even over the blunt apex. In all, however, the inferior and superior involucre seem to be of the same texture and parallel, in that respect differing from *Davallia*.

4. L. *adiantoides*, J. Sm.; small tufted, caudex none, fronds pinnated lanceolate, pinnæ lax very thin membranaceous deciduous pale green half-ovate horizontal obtuse, superior base truncate lower margin straight upper curved (convex) unequally lobed the lobes rounded a little jagged, sori transversely oblong or reniform terminating 2-4 veins, stipes short and rachis glossy black. (Tab. LXI. C).—*J. Sm. in Hook. Journ. of Bot.* iii. *p.* 415, (*name only*).

Hab. South Camarines, Malay Archipelago, *Cuming*, *n.* 176.—No caudex. Root and stipites tufted: the latter very short. The form of the pinnæ a good deal resembles some states of *L. cultrata*, but the ebony-black and glossy stipes, which remains after the pinnæ have fallen, and the absence of caudex, afford distinguishing marks.

5. L. *ovata*, J. Sm.; small tufted from a creeping caudex, fronds lanceolate, pinnæ sessile oblong subrotund very obtuse subcoriaceous rather obliquely cuneated at the base opaque deciduous, sori rather broad and continuous extend-

ing to the broad apex, veins subflabellate, stipes elongated and rachis ebony black glossy. (TAB. LXIV. A.) — *J. Sm. MSS. (omitted by Mr. Smith in the Enum. Fil. Philipp. published in Hook. Journ. of Bot. v.* iii.)

Hab. Luzon, *Cuming, n.* 175.—A very distinct and rare species, caudex and coarse roots and stipes and rachis black. Pinnæ as in *L. adiantoides*, and as in many *Adianta*, deciduous, rather thick and somewhat coriaceous, entire, but sometimes with a little auricle at the superior angle next the rachis, quite sessile, very obtuse; involucre rather broad, continuous and extending to the rounded apex.

6. L. *Lobbiana*, Hook.; caudex somewhat creeping, fronds tufted pinnate linear-lanceolate much acuminate, lower pinnæ remote, the rest approximate, all of them slightly petiolate patent submembranaceous subnitent obliquely flabellate or half ovate, the superior base truncate, upper margin curved (convex) lobate soriferous, sori interrupted linear, stipes rather short and rachis brown. (TAB. LXII. C.)

Hab. Java, *Mr. Thos. Lobb.*—A very handsome and apparently distinct species, in many respects however according with the characters of *L. lucida* and *L. gracilis*, Bl., from the same country. But, without a figure, I should despair of making the character of the present one intelligible, so difficult is it to define in words the forms of the pinnæ of these plants. It is a very handsome species, a foot or a foot and a half long (the base and apex only being represented on our plate), erect, rather rigid. Stipites (much tufted) and rachis glossy brown, pale. Fronds deep green, a little shining. All the pinnæ are lobed in the upper margin, and the sori are as long as the lobes are broad.

7. L. *concinna*, J. Sm.; caudex somewhat creeping, fronds tufted pinnate linear-elongate acuminate, lower pinnæ remote, the rest close, all of them patent small submembranaceous pale obliquely flabellate obtuse few-veined, sorus continuing along the convex upper margin which is entire except sometimes in the lower pinnæ, stipes rather short and rachis brown. (TAB. LXI. B.)—*J. Sm. in Hook. Journ. Bot.* iii. *p.* 415, (*name only*).

Hab. Luzon, *Cuming, n.* 198. — Allied to the preceding, but rather smaller (a foot long), narrow, paler colored, not at all glossy; the pinnæ, especially the upper ones, closer to one another and to the rachis, quite entire, except sometimes in the lower ones, and approaching to flabelliform. Mr. J. Smith likens this to *L. elegans*, Hook., in Ic. Pl. i. t. 98, from Columbia, but that I fear is only an unbranched state of *L. stricta*.

8. L. *scandens*, Hook.; caudex very long stout climbing and rooting, clothed with ferruginous scales, fronds distant lanceolate elongate (large) pinnate subsessile dark green rather rigid, pinnæ approximate oblong-oval subdimidiate subfalcate obtuse entire truncate at the superior base which is

close to and parallel with the pale brown rachis, lower vein marginal strong, sori linear continuous along the upper margin and apex. (TAB. LXIII. B.)— L. decomposita, *J. Sm. in Hook. Journ. Bot.* iii. *p.* 415.

Hab. Luzon, *Cuming*, *n.* 405. Isle of Leyti, *Cuming*, *n.* 306. Pulo Penang, *Lady Dalhousie*.—This and the following are by far the largest of the simply pinnated group of true *Lindsææ* (Eulindsææ), and remarkable for the stout scaly climbing caudex, with distantly placed, long fronds, and dark green, closely placed pinnæ. In this, too, the fronds are nearly sessile, the stipes and rachis pale brown, semiterete.

9. L. *oblongifolia*, Reinw.; caudex long scandent scaly, fronds stipitate elongate (large) lanceolate attenuated, pinnules oblong obtuse superior base and lower margin straight truncate, upper margin and blunt apex crenate, involucres interrupted marginal, lower nearly marginal, stipes and rachis pale brown. (TAB. LXI. D.)—L. oblongifolia, *Reinw. MSS. (according to J. Sm.)*

Hab. South Camarines, Malay Archipelago, *Cuming*, *n.* 186. — Much resembling the foregoing, *L. scandens*, but the stipes is longer, the pinnæ narrower, less falcate, upper ones slightly crenate or lobed, so that the involucres are interrupted.

10. L. *linearis*, Sw.; caudex creeping brittle, fronds distant linear acuminate membranaceous pinnate, pinnæ rather rigid sessile flabellate (when dry revolute) the anterior margin soriferous uninterrupted, the involucres broad, sterile pinnæ subdimidiato-ovate toothed, stipes long glossy and the rachis purple brown. — *Sw. Syn. Fil. p.* 118 *and* 318, *t.* 3, *f.* 3. *Br. Prodr. Nov. Holl. p.* 156. *Kze. in Schkh. Suppl. p.* 30, *t.* 16. Adiantum lineare, *Poir. Encycl. Bot. Suppl.* i. *p.* 139. Lindsæa lunata, *Willd. Sp. Pl.* v. *p.* 421. L. imbricata, *Desv.*

Hab. New Holland and Van Diemen's Land, *Brown*, *Sieber*, *n.* 118, *Gunn*, *Lawrence*. Swan River, West Australia, *J. Drummond*, *n.* 4, 226, and 401. New Zealand, *A. Cunningham*, *Colenso*, *J. D. Hooker*, *Dr. Sinclair*. — A small and very distinct species of Fern, from 2—3 inches to a foot long, rigid, firm, with small pinnæ. Stipes and rachis dark glossy purple. Pinnæ rather distant, subrigid, lower ones almost opposite, subrigid.

11. L. *lucida*, Bl. (not Wall.); "fronds elongate pinnated membranaceous glabrous (shining), pinnæ subsessile dimidiato-ovate rather acute, truncate at the superior base, the superior margin subinciso-dentate or quite entire, sori linear entire or interrupted, stipes and rachis tetragonous glabrous." *Bl. En. Fil. Jav. p.* 217.

Hab. Trunks of trees in mountainous woods, Java, *Blume*. — "Differs from *L. cultrata* in the shorter rather acute pinnæ, shining above, and in

the tetragonous stipes and rachis. Resembling also *L. flabellulata*, Dry., from which it appears to differ in the lower pinnæ being incised above only, not pinnatifid on both sides."—But assuredly the *L. flabellulata* of Dryander has no specific resemblance to *L. cultrata*.

12. L. *gracilis*, Bl.; "fronds pinnate membranaceous glabrous (shining above) pinnæ subsessile dimidiato-ovate obtuse the superior base truncate, the superior margin incisodentate, sori linear interrupted, stipes and rachis tetragonous glabrous." *Bl. En. Fil. Jav. p.* 217.

Hab. Mountain places, province of Bantam, Java, *Blume*. — "Differs from the preceding (*L. lucida*, Bl.) in the slender stature and more obtuse pinnæ."

13. L. *pectinata*, Bl.; "fronds pinnate elongate membranaceous glabrous, pinnæ subsessile dimidiato-oblong obtuse, the superior base truncate, the superior margin repando-denticulate, sori linear subcontinuous, stipes very short and rachis tetragonous glabrous." *Bl. En. Fil. Jav. p.* 217.

Var. B. "pinnæ narrower, sori subrotund separated." *Bl. l. c.*

Hab. Rocks and trees in the interior of Java. — B. On trees near Buitenzorg, Java, *Blume*. —"Differs from the preceding (*L. lucida*, *L. gracilis*, *L. pectinata*, Bl., &c.), in the elongated frond, the very short stipes, and in the inner involucre being exceedingly narrow."

14. L. *Bantamensis*, Bl.; "fronds pinnate membranaceous glabrous very shortly stipitate, pinnæ subsessile dimidiato-oblong obtuse at the upper margin slightly incised, segments linear obtuse entire or emarginate." *Bl. En. Fil. Jav. p.* 218.

Hab. Mountain woods, province of Bantam, Java, adhering to trunks of trees, *Blume*. — "Distinguished from the preceding (*L. pectinata*) by the more tender frond and the pinnæ at the upper edge slightly incised."

15. L. *hymenophylloides*, Bl.; "fronds pinnate membranaceous glabrous shortly stipitate, pinnæ subsessile dimidiato-oblong obtuse deeply incised at the upper edge, segments linear obtuse bifid or twice bifid, sori subrotund." *Bl. En. Fil. Jav. p.* 218.

Hab. On trees, interior of Java, *Blume*.

16. L. *parvifolia*, Pr.; "fronds linear pinnate, pinnæ alternate sessile rhomboid dimidiate crenulate above rounded at the apex retuse at the base, stipes and rachis semiterete margined." *Pr. Tent. Pterid. p.* 131. L. microphylla, *Presl, Reliq. Hœnk.* i. *p.* 59, *t.* 10, *f.* 2, *(not Sw.)*

Hab. Mexico, (*Presl*). — "Caudex subrotund, minute, hairy. Stipes half an inch. Frond 6—7 inches. Pinnæ 2 lines long, rather narrower than long, sessile, alternate, rhomboid-dimidiate, very glabrous. Veins fla-

bellate. Sori wanting." — The figure has to me quite the appearance of small unbranched states of *L. stricta*, Dry., also an inhabitant of Mexico, and is indeed the very next species which is described in the work above quoted. Kunze, however, is of a different opinion, and mentions its affinity with *L. linearis*, Sw., of New Holland, when describing that species.

17. L. *Leprieurii*, Hook.; caudex filiform creeping, fronds oblong membranaceous pinnate, pinnæ half-ovate acuminate deflexo-falcate truncate at the superior base which is parallel to the obscurely winged rachis, lower vein parallel to, but a little distant from, the margin, terminal pinnæ with 3 acuminated lobes, sorus narrow continuous distant from the margin, stipes and rachis tetragonal dark glossy brown. (TAB. LXII. D.)

Hab. French Guiana, in mountainous places, *M. Leprieur (Herb. Rothery)*.—Plant small, scarcely a span high. Stipes dark brown, almost black and glossy. Pinnules an inch or more long, decurvo-falcate, especially the lower one. Lower valve of the involucre much narrower than the upper which is quite foliaceous, not differing in texture from the rest of the pinna. Terminal pinna formed of 3 combined pinnæ, with a main nerve running through the centre.

18. L. *falciformis*, Hook.; small tufted, caudex creeping clothed with chaffy hairs, stipes very short brown and as well as the rachis somewhat 4-angled, fronds lanceolate pinnate, pinnæ half oval-oblong obtuse falcate deflexed especially at the very obtuse apex, involucre continuous marginal, lower vein parallel to, but distant from, the margin. (TAB. LXIV. B.)

Hab. British Guiana, *Schomburgk.*—Stipites tufted, very short. Fronds somewhat rigid, small, with rather numerous and rather close-placed pinnæ.

19. L. *crenata*, Kl.; caudex creeping clothed with fulvous hairs, fronds erect strict rigid oblong-lanceolate pinnate, pinnæ approximate horizontal subcoriaceous opaque (not shining) dimidiato-oblong (almost 4-sided) very obtuse subfalcate the upper margin and apex crenato-serrate with a narrow raised border or margin, the lower edge costate, sori "continuous within the superior margin," stipes dark brown glossy tetragonal. — *Klotzsch, in Linnæa*, 1844. *p.* 546.

Hab. British Guiana, *Schomburgk.* — It is to be regretted that this curious plant is not known to me in fructification. The stipes is short, and as well as the erect and straight rachis, dark brown, glossy, as if varnished. Frond scarcely a span high, oblong-lanceolate. Pinnæ closely placed, rigid, subcoriaceous, approximate, somewhat imbricating, horizontal; the lower edge constituting the costa or midrib, of the substance of the rachis (more distinct than in any other of the *Eulindsææ*). The upper margin, and the very blunt apex especially, are crenato-serrate and edged by a narrow elevated border of a firm cartilaginous character. I have only seen it in Mr. Smith's collection, but without sori.

20. L. *pumila*, Kl.; small tufted, caudex somewhat creeping, fronds lanceolate pinnate submembranaceous, pinnæ erecto-patent rather distant obliquely cuneate with obtuse angles and few veins, sorus marginal continuous but not occupying the entire breadth of the pinnæ, stipes brown and as well as the straw-coloured rachis tetragonal. — *Klotzsch, in Linnæa*, 1844, *p.* 545.

Hab. British Guiana, *R. Schomburgk.*—A small, pale green, delicate species, scarcely more than four inches high, including the stipes. It seems to be a distinct species, bearing perfect fructification, but it is, perhaps, most nearly allied to the unbranched state of *L. stricta*, though of a far more delicate texture and with differently shaped pinnæ, for all are obliquely cuneate.

21. L. *dubia*, Spr.; caudex creeping slender, stipes rather long dark brown at the base, fronds ovate-oblong pinnate, pinnæ patent linear-lanceolate acuminate, slightly falcato-incurved, obliquely cuneated at the base, lobato-serrate on both margins towards the rather obtuse apex, main vein or costa excentric but distant from the inferior margin, becoming central towards the apex, and there only, throwing out veins on both sides, sorus marginal on the upper edge and continuous, except at the apex, where it is interrupted on the lobes or teeth, appearing occasionally on both margins. (Tab. LXIV. C.)—*Spreng. Syst. Veget.* iv. *p.* 79. L. tenera, *Kaulf. En. Fil. p.* 219.

Hab. French Guiana, *Richard*; British Guiana, *Schomburgk.*—A most distinct and well-marked species, evidently tending to unite the group or genus *Isoloma* (J. Sm.) with true *Lindsæa*; for the upper portion of the principal vein is central, the rest excentric; and the sori are produced only on the upper margin in the latter case, on both margins, occasionally, in the former.

22. L. *acutifolia*, Desv.; "fronds pectinato-pinnate, pinnæ on both sides pulverulento-tomentose (tomentum deciduous) lanceolate entire acute contracted below truncate at the base and above auriculate, sorus continuous, rachis tomentose."—*Desv. Mem. Soc. Linn.* ii. *p.* 312.

Hab. Mauritius, (*Desvaux*).—"Pinnæ an inch and a half long." I have seen no *Lindsæa* corresponding with this from the Mauritius.

†† *Costa central. Sori on both margins of the equal pinnæ.* Isoloma, *J. Sm.* Sp. 23—25.

23. L. *Walkeræ*, Hook; caudex tall creeping clothed with scale-like hair, stipes very long and as well as the rachis dark purple glossy, fronds broad-lanceolate pinnate, pinnæ coriaceous subopposite remote lanceolate or linear-lanceolate

equal, costa central, veins copious almost parallel with the costa, sorus marginal continuous on both sides. (Tab. LXIX. A.)

Hab. Ceylon, *Mrs. Gen. Walker.*—A very fine and distinct species, with the habit of *L.* (*Schizoloma*) *ensifolia*. Caudex thicker than a crow's quill, creeping, clothed with ferruginous, scale-like hairs. Stipes often a foot long, dark purple-black, glossy; rachis the same colour. Frond, six inches to nearly a foot long, of from six to seven pairs (for they are nearly opposite) of linear-lanceolate, acuminated, subcoriaceous pinnæ, with a terminal petiolated one, rather obtuse at the point; the base cuneate; their sides equal; costa central, throwing out numerous almost parallel, or but slightly spreading, dichotomous veins. Sori on both sides and forming the margin, continuous, narrow. The terminal pinna is sometimes lobed or angled on one or both sides of the base.

24. L. *lanuginosa*, Wall.; caudex tall robust, fronds oblong-lanceolate pinnated, pinnæ subcoriaceous approximate very numerous oblong approaching to lanceolate more or less falcato-incurved obtuse or acute deciduous, the sides equal, the base truncate sessile below clothed with deciduous wool, costa central, veins spreading copious in old fronds terminating on the upper side in white cretaceous dots just within the margin, sorus on both sides and at the margin continuous, stipes short and rachis (stout) more or less woolly. (Tab. LXIX. B.—*Wall. Cat. n.* 154. Isoloma, *J. Sm.*

Hab. Growing on trees in Sincapore and Penang, *Dr. Wallich*; New Guinea, *Mr. Hinds.*—This has, probably, the longest fronds of any in the genus. Some of my specimens are two feet long, and stout in proportion, and in none do I appear to have the entire stipes. Caudex unknown to me. Stipes and rachis pale brown, terete, furrowed on one side. Pinnæ very numerous, 2—3 inches long, very deciduous, as in *Nephrolepis*, Schott, which the plant resembles in habit and in the presence of the cretaceous white dots. It is difficult to obtain perfect specimens.

25. L. *divergens*, Wall.; caudex creeping, stipes and rachis ebony-black glossy, fronds lanceolate pinnate, pinnæ approximate crowded horizontal lanceolate obtuse subsemihastate at the base, glaucous beneath, the sides equal, costa central, veins oblique once forked distant internal obscure, sorus marginal and continuous on both edges and at the apex.—*Hook. and Grev. Ic. Fil. f.* 226. Vittaria divergens, *Herb. Roxb.*—*Wall. Cat. n.* 2191. *Roxb. Crypt. Pl.* (*ed Griff.*) *p.* 48.

Hab. Prince of Wales' Island, *Mr. W. Roxburgh.* Malacca, *Griffiths*, *Cuming*, *n.* 395.—The closely-placed lanceolate pinnæ, glaucous beneath, give to the frond of this very rare species of *Lindsæa* a good deal the habit of a branch of *Gleichenia*. It differs in many particulars from the other species of this group, especially in the immersed lax and simply

forked veins, which terminate in clubbed apices at some little distance from the margin in the sterile fronds.

Obs. Some species of *Lindsæa* that have been supposed to be simply pinnate and described as such, for example *L. stricta*, *L. falcata*, will be found among the compound ones; and others, with reticulated veins, among the *Schizoloma* group.

**** Fronds bi-tripinnate (in some states only pinnate) or decompound.* Sp. 26—47.

(Costa excentric or marginal or obsolete. Sori on the superior margin of the unequal pinnæ. Lindsæa, *J. Sm., g.)*

26. L. *cuneata*, Willd.; "frond pinnate, pinnæ lanceolate elongated and pinnated at the apex, segments cuneiform rounded and entire at the apex."—*Willd. Sp. Pl.* v. *p.* 423. L. heterophylla, *Bory, MSS.*, (*not Dry.*)

Hab. Woods, Bourbon, *Bory, (Willd.)*.—This seems to be only known to M. Bory and to Willdenow, the latter of whom, after a meagre description, remarks, "In litteris adnotavit Illustr. Bory de St. Vincent, frondem esse valde polymorpham."

27. L. *flabellulata*, Dry.; caudex creeping, stipites tufted generally elongated, fronds linear-lanceolate and pinnate or deltoid and caudate bipinnate, pinnules approximate shortly petiolate rather rigid flabellate and approaching to lunate or subrhomboid with the sides unequal the base obliquely cuneate, sometimes the upper ones are confluent, the superior margin crenulate or soriferous, sori continuous or interrupted, involucres toothed.

α. *Dryandri*; pinnules lunulato-flabellate. L. flabellulata, *Dry. in Linn. Trans. v.* iii. *p.* 41, *t.* 8, *f.* 2.

β. *polymorpha*; pinnules more frequently rhombeo-cuneate. L. polymorpha. *Wall. Cat. n.* 14. *Hook. et Grev. Ic. Fil. f.* 75.

γ. *gigantea*; two feet high, pinnules large in proportion rhomboid flabellate, terminal ones always confluent and much acuminated. (Tab. LXIII. C.).

Hab. α. China, *Sir G. Staunton, Bart., D. Nelson*, and *Captain Beechey*. Sumatra, *C. Miller*. Port Essington, *N. Coast New Holland*. Java, *Lobb*. —β. Singapore, *Wallich*.—γ. Java, *Lobb*. Assam and Khasiya hills, *Griffith*.—A very variable plant, but happily there are good figures to refer to and authentic specimens at hand to aid in its determination.

28. L. *tenera*, Dry.; caudex creeping scaly, stipites tufted, fronds deltoid-ovate 3—4 pinnate, pinnules all petiolate cuneate or obliquely cuneate membranaceous variously cut and lobed, the lobes soriferous at the apices.—*Dry. in Linn.*

Trans. v. iii. *p.* 42, *t.* 10. L. interrupta, *Wall. Cat. n.* 2195. Vittaria interrupta, *Roxb. Crypt. Pl. Ind. p.* 49.

Hab. East India, *Missionaries of the Soc. of United Brethren* (*Dryander*). Madras, *Dr. Wight*, *Wallich*, (*n.* 2195). Malacca, *Cuming*, *n.* 399. Mount Ophir, and in Java, *Thos. Lobb.*—This certainly resembles some states of *L. flabellulata*, but the texture is much thinner and more membranaceous, the pinnules more cuneated and much more uniform, more decidedly and constantly petiolate and more lobed, so that the sori, being on comparatively narrow lobes, the fructification is much interrupted; and the pinnules are nearly confluent. Dryander's figure is highly characteristic, except that the specimen is a small one and the pinnules scarcely so much lobed as usual. Our specimens are generally a foot and a half long, the stipes about equal in length to the frond or longer.

29. L. *media*, Br.; "fronds bipinnate deltoid, pinnules obovato-rhomboid subcoriaceous, inferior ones lobed, the rest entire, the superior edge unisorous, sorus continuous the sterile ones serrated at the apex, stipes tetragonous."—*Br. Pordr. Fl. Nov. Holl. p.* 156.

Hab. Tropical shores of New Holland, *Brown*. E. Coast of Tropical New Holland, *A. Cunningham*.—A span to nearly a foot high. In general aspect much resembling *L. tenera*, but the pinnules are less lobed and the whole more rigid and subcoriaceous.

30. L. *filiformis*, Hook.; small, caudex? rachis long slender filiform flexuose scandent semiterete grooved anteriorly, frond bipinnate, pinnæ nearly opposite secund linear-lanceolate, pinnules very small distant petiolate obliquely- or dimidiato-ovate membranaceous obscurely lobed and unisorous on the anterior margin, vein 2—3 branched, 2 superior branches bearing the sorus. (TAB. LXIII. D.)

Hab. British Guiana, *Schomburgk*.—I regret that I possess but an imperfect specimen of this curious little fern. This is a span long, about one-half being represented at our TAB. LXIII. D. The caudex is wanting. The rachis, as I take it to be, is long and flexuose, glossy, the pinnæ nearly opposite, secund, as if the rachis were climbing or trailing and the pinnæ were drawn forward in one direction by the light. The fructification never occupies more than 2 veins or branches of veins (rarely only one) and may thus have an equal claim to be considered a *Davallia* (Subgenus *Odontoloma*); and I have already alluded to the close affinity of that group with *Lindsæa*.

31. L. *Catharinæ*, Hook.; frond ovato-deltoid acuminate 3—4 pinnate very thin and membranaceous bright green, pinnæ cuneate and bi-tripartite or (in circumscription) half ovate with the superior base truncate and 3 or 4 times deeply divided into cuneate spreading segments undivided or 2-lobed the apex serrated unisorous, involucres reniform transversely

elongated at some distance from the margin, stipes brown, rachis straw-colour. (TAB. LXV. B.)

Hab. St. Catharine's, Brazil, *Captain Beechey*.—Stipes and frond each 6—8 inches long. This again is a very Davalloid-looking plant, of the "cuneate" section or Subgenus of that family, and in many respects allied to *Davallia bifida*. Here, however, the ultimate lobes are never single-veined, but they bear 2—4 veins, and the sorus is lengthened out transversely in proportion.

32. L. *Gardneri*, Hook; frond subdeltoid acuminate membranaceous dark green rather rigid 3—4 pinnate, pinnæ half-ovate with the superior base truncate or smaller and obliquely cuneate cut about half-way down into broadly cuneate toothed segments which are approximate entire or 2-lobed the apices uni- or bisorous, sori reniform terminating 2 or 4 veins. (TAB. LXV. C.)

Hab. Organ Mountains, Brazil; on a dry shady bank, *Mr. Gardner*, *n.* 156. — Nearly allied to the preceding, but darker-coloured in every part, more rigid, the pinnules much less deeply divided and the divisions more approximate (having much narrower sinuses).

33. L. *elongata*, Lab.; caudex creeping, stipes terete furrowed on one side hispid at the base, frond deltoid-ovate bi-tripinnate, pinnæ ovate or lanceolate acuminate ultimate ones pinnatifid, pinnules and segments obovate obtuse fertile ones truncated, all of them coriaceous many-veined somewhat toothed, sori terminating the lobes but opening downwards (on the underside).—*Labill. Sert. Austr. Caledon. p.* 6, *t.* 9.

Hab. New Caledonia, *Labillardière*.—The author just mentioned has well figured and described this plant; and no other botanist seems to have gathered it, so that it is probably peculiar to New Caledonia: but it is again one of those ferns which has as strong a claim to be placed in the Genus *Davallia* as in *Lindsæa*. In habit and texture it is allied to *Davallia retusa* (p. 188, t. 52, A.), but is much smaller, much less divided, more coriaceous, more closely-veined, and the lobes and ultimate pinnules are less truncate and cuneate, especially the barren ones; so that if placed in *Davallia* it could not well be referred to the cuneate section along with that species. I am indebted to P. B. Webb, Esq., for an original specimen of Labillardière.

34. L. *pendula*, Kl.; caudex creeping clothed with compact paleaceous hairs, stipes elongated, frond (rather small) ovate bipinnate, pinnæ horizontal linear obtuse terminal one elongated, pinnules all pendulous and secund obovate obliquely cuneate subcoriaceous, sori quite marginal broad. (TAB. LXV. A.)—*Klotzsch, in Linnæa*, 1844, *p.* 548.

Hab. British Guiana, *Rich. Schomburgk, in Herb. J. Smith*.—This is a very remarkable species, extremely unlike any other, of which I have seen no specimen, save one sent by Dr. Klotzsch to Mr. J. Smith, and which is

here figured. The pinnules are small, uniform, invariably pendant, not only on the nearly horizontal pinnæ, but upon the erect terminal one, and though distichous in insertion they all point to one side so as to be secund.

35. L. *quadrangularis*, Rad.; stipes 4-sided, frond bipinnate, pinnæ linear-lanceolate elongated attenuated rather slender, pinnules half-ovate subtrapeziform obtuse, superior base truncated occasionally subauriculated, gradually smaller towards the apices of the pinnæ, superior margin straight eroso-dentate, sori within the margin continuous or interrupted. —*Raddi, Fil. Bras. p.* 55, *t.* 74.

β. rather larger, sori more interrupted. L. trapeziformis, *Langsd. et Fisch. Fil. p.* 21, *t.* 24. L. pallida, *Kl. in Linnæa*, 1844, *p.* 547.

Hab. Rio Janeiro, *Raddi (Herb. nostr.)* Brazil, *Mr. Gardner, n.* 158, 1225, 2987.—β. British Guiana, *R. Schomburgk (Klotzsch), n.* 1205. St. Catharine, Brazil, *Langsdorff; Allan Cunningham.* Columbia, *Linden.* Venezuela, *Aldridge.* Dominica, *Dr. Imray.*—A variable plant, of which the β. seems to be the most common form and the one nearest to L. *trapeziformis.*

36. L. *horizontalis*, Hook.; stipes upwards 4-sided, frond bipinnate, pinnæ broad-lanceolate acuminate, pinnules approximate horizontal half-ovate narrow elongated straight rather acute gradually smaller towards the apex of the pinnæ, superior base truncate, superior margin quite entire, sori a little within the margin continuous. (Tab. LXII. B.)

Hab. Dry woods, Organ Mountains, *Gardner, n.* 157. Pangoa, Peru, *Mathews.*—Resembles *L. quadrangularis*, but the pinnæ are much broader, the pinnules are almost exactly horizontal, larger indeed, but longer and narrower in proportion, more acute, the superior margin quite entire, sori always continuous.

37. L. *trapeziformis*, Dry.; stipes 4-sided, frond bipinnate (pinnate when young), pinnæ broad-lanceolate rather obtuse, pinnules membranaceous close half-ovate lunulato-falcate (decurved) superior base truncate upper margin forming almost the segment of a circle quite entire, terminal pinnule rather large subrhomboidal-triangular, sorus within the margin continuous and extending to the apex.—*Dry. in Linn. Trans. v.* iii. *p.* 42, *t.* 9. *Sw. Syn. Fil. p.* 119. *Willd. Sp. Pl.* v. *p.* 424. *Hook. Gen. Fil. t.* 63, A.

β. larger, pinnæ more falcate. L. nitidissima, *Willd. Sp. Pl.* v. *p.* 423. L. decomposita, *Willd. Sp. Pl.* v. *p.* 425. *Wall. Cat. n.* 153. L. falcata (*young state*), and L. Schomburgkii, *Klotzsch, in Linn.*, 1844, *p.* 545. *Dry.*

in Linn. Trans. iii. *p.* 41, *t.* 7, *f.* 2. *Sw. Syn. Fil. p.* 118. *Willd. Sp. Pl.* v. *p.* 422. L. divaricata, *Kl. in Linnæa*, 1844, *p.* 547. • L. Portoricensis and L. Brasiliensis, *Desv.* (*fide Spr.*)

γ. much smaller, firmer and somewhat coriaceous. L. parasitica, *Wall. Cat. n.* 2196. Vittaria parasitica, *Roxb. Crypt. Pl. p.* 48.

Hab. West Indies and tropical S. America, and β. Guiana, *Hostmann, n.* 108; and *Schomburgk, n.* 347. Brazil, East Indies, and Penang, *Wallich.* Mergui and Malacca, *Griffith.*—γ. Malacca, *Cuming, n.* 333. Penang, *Lady Dalhousie.* Prince of Wales' Island, *Dr. Roxburgh;* on the trunks of trees. — Assuredly a very protean species, and widely extended in the tropics of the Old and of the New World. So variable are the pinnules in different specimens and even on the same plant, that it is next to impossible to form a specific character which shall distinguish them. The figure of Dryander does not represent the more usual form, though the superior pinnules not unfrequently assume that character. The larger specimens with the more falcate pinnules are the most abundant and the most widely extended both in the East and West Indies. Where the one is found, however, the other is generally found also. Mr. Griffiths remarks of his recent specimens, that in certain lights they exhibit a metallic blue tinge; and this is singularly the case with a *Lycopodium* (Sect. *Stachygynandrum*), now cultivated in the stoves of our botanic gardens. The *Lindsæa falcata* of Dryander is simply a young, less divided state of *L. trapeziformis.*

38. L. *arcuata*, Kze.; "frond bipinnate, pinnæ (3—7) alternate linear-oblong acuminate, pinnules dimidiato-ovate falcate, lowest and ultimate ones flabelliform, all incurved at the obtuse apex, sori continuous on the superior margin." *Kze. Syn. Pl. Crypt. Poepp. p.* 86.

Hab. Woods Pampayaco, Peru, *Poeppig.*—"Frond 7—12 inches, glabrous. Its place is near *L. trapeziformis.*" *Kze.*

39. L. *caudata*, Hook.; stipes terete and as well as the rachis deep brown glossy, frond bipinnate, pinnæ narrow numerous (11—17) lanceolate the apex long attenuate caudate, pinnules half ovate lunulato-falcate decurved membranaceous close, superior base truncate upper margin forming almost the segment of a circle quite entire, terminal ones gradually smaller on the caudex or tail-like point, sori at the very margin and continuous to the obtuse apex.

Hab. Adam's Peak, Ceylon, *Mrs. Gen. Walker.*—I was at first disposed to refer this to a state of *L. trapeziformis*, but the more numerous pinnæ, tapering to a tail-like point, blunter pinnules, exactly marginal sori, terete and darker coloured stipes, seem to indicate a specific distinction; and these characters exist in four fine specimens sent at different periods. I am not disposed at all times to lay much stress on the 4-sided or terete stipes, which differences are, sometimes at least, caused by the greater or less state

of ripeness of the plant. The present species dries of a very dark colour; *L. trapeziformis* generally of a light colour.

40. L. *stricta*, Dry.; stipes terete grooved on one side, frond rigid (rufescent) bi- rarely tri-pinnate (simply pinnate when young), pinnæ linear elongated straight gradually attenuated erect or slightly patent terminal one elongated, pinnules trapezoid flabelliform or lunulato-cuneate gradually smaller upwards subcoriaceous a little distant, upper base truncated lower margin often arched upper semicircular entire or (barren) serrated (or the pinnæ are sometimes lunate with a cuneate base), sori continuous (sometimes short) very broad placed at some distance within the superior margin, often bent back or downwards when dry.—*Dry. in Linn. Trans.* iii. *p.* 42. *Schkh. Fil. t.* 114. *Willd. Sp. Pl.* v. *p.* 425. *Sw. Syn. Fil. p.* 119. L. Javitensis, *H. B. K.*, *Willd. Sp. Pl.* v. *p.* 424. *Raddi, Fil. Bras. p.* 56, *t.* 75, *f.* 1. L. gracilis, *Kl. in Linnæa*, 1844, *p.* 549. L. Raddiana, *Kl. in Linnæa*, 1844, *p.* 549. L. elata, *Desv.* L. pusilla, *Splitg. En. Fil. Surin. p.* 35.—Frond simple; L. rigescens, *Willd. Sp. Pl.* v. *p.* 424. L. elegans, *Hook. Ic. Pl. t.* 98. L. microphylla, *Presl, Rel. Hænk. p.* 59, *t.* 10, *f.* 2 (*barren*) ?*

β. *tripinnata;* frond tripinnate larger more membranaceous, pinnules more frequently lunate.—*Gardn. Bras. Coll. n.* 5323.

Hab. Throughout tropical America, especially on the western side. West Indies, Trinidad, and Columbia, *Funck, Cuming, n.* 1101. Santa Martha, *Purdie.* Mexico, *Hænke, Otto.* Isle of Gorgona, west of Panama, and Sandwich Islands (?), *Barclay.* Brazil, *Gardner, n.* 5324.—β. Minas Geraes, *Gardner, n.* 5323.—An extremely variable plant, as is so much the case with the individuals of this genus, in size, ramification, and in the form of the pinnules, though the common form has a very peculiar aspect and colour. According as the different forms of the pinnules have predominated, authors have described them under different names, and in language so different, that, without authentic specimens, no one could suppose that the descriptions applied to the same species. The common form is fairly represented by Raddi, l. c. under the name of *L. Javitensis*, as is Schkuhr's of a single pinna. Our figure of *L. elegans* l. c. is equally characteristic of the unbranched state of the plant, which is often, but not always, so when young, for it frequently retains that character when in full fructification. The plant is rigid, bearing a few upright, much attenuated pinnæ, and pinnules gradually becoming smaller upwards. There are states, however, with the pinnæ larger, more membranaceous, as is the case with our β, and then it becomes difficult to distinguish it from *L. Guianensis.*

41. L. *Guianensis*, Dry.; caudex creeping, stipes terete grooved on one side, frond large pinnated rather flaccid

* See *L. parvifolia*, supra, p. 207.

frequently curved or falcate, pinnæ 3—7 or 13 linear-strap-shaped very much elongated especially the terminal one acuminated falcate, pinnules approximate horizontal semi-ovate very obtuse membranaceous entire gradually smaller towards the apex, superior base truncate, upper margin semicircular, lower straight or slightly arched, sorus narrow a little within the margin continuous but frequently abbreviated not occupying the whole of the upper margin. (Tab. LXII. A.) *Dry. in Linn. Trans.* iii. *p.* 42. *Sw. Syn. Fil. p.* 119. *Willd. Sp. Pl.* v. *p.* 434. L. rufescens, *Kze. in litt.* (*fide J. Sm.*) Adiantum Guianense, *Aubl. Guian. p.* 963, *t.* 365.

β. *major;* larger, 1½, 2, or 3 feet, pinnules less approximate. L. Moritziana, *Kl. in Linnæa*, 1844, *p.* 548.

Hab. Guiana, common, *Aublet, Schomburgk, n.* 346; *Hostmann, n.* 96.—β. French Guiana, frequent, *Leprieur* (*Herb. Rothery*). Bluefield Mountains, Jamaica, *Purdie*. Venezuela, *Aldridge*.—This fern is much more uniform in its habit than the preceding. What I have called our β. is larger and with more lax or distant pinnules than α. which is well represented in Aublet, and (a pinna) in our Tab. 62, A. Still there seem to be intermediate states between this and *L. stricta*.

42. L. *rigida*, J. Sm.; caudex long creeping scaly, rough with short distant inconspicuous prickles, frond bipinnate rigid (rufescent) subfalcate, pinnæ 7-9 remote linear alternate falcate terminal one very long, pinnules approximate coriaceous flabellate or rhombeo- or oblong-flabellate, upper base truncate, lower margin straight or slightly arched, upper one semicircular lobed and crenated margined, veins very prominent on both sides, sori abbreviated quite marginal on one or two terminal lobes, involucre coriaceous. (Tab. LXIII. A.) —*J. Sm. in Hook. Journ. of Bot.* iii. *p.* 415, (*name only*).

Hab. Malacca, *Cuming. n.* 397. Mount Ophir, Malacca, *Griffith, Mr. Thos. Lobb*.—A most distinct and very handsome species. Habit of some of the commoner forms of *L. stricta* of the New World, but always more or less falcate in the fronds and in the pinnæ, far more coriaceous and rigid, with singularly prominent pale veins, of which those bearing the sori seem to be connected by a transverse one as far as the sorus extends. Involucres opening quite at the margin (never bending back or down) and singularly rigid and coriaceous.

43. L. *Lessonii*, Bory; caudex filiform creeping scaly, stipes tetragonal filiform, frond (small) broad lanceolate membranaceous pinnate and especially below bipinnate, pinnæ oblong-lanceolate lobed (or pinnated) cuneate at the base, ultimate ones and pinnules cuneate decurrent, their apices toothed, costa central in the undivided pinnæ, with the sori

on the lobes intramarginal, terminal and continuous on the cuneate pinnules.—*Bory in Duperrey, Voy. p.* 278, *t.* 3, *f.* 2. *All. Cunn. Fl. N. Zel. in Hook. Comp. Bot. Mag.* ii. *p.* 366. L. discolor, *Colenso.*

Hab. New Zealand, Northern Island, *Duperrey, All. Cunningham, Mr. Colenso, J. D. Hooker.*—The figure in Duperrey well represents our form, but the specimens are generally much more truly bipinnate, sometimes almost to the apex, more frequently in the lower portion of the frond. Dr. Hooker suspects, and with some justice, that the species is only a simpler form of the following, though intermediate states are rare.

44. L. *trichomanoides*, Dry.; caudex filiform creeping scaly, stipes tetragonal filiform, frond (small) broad lanceolate membranaceous bipinnate sub-tripinnate, pinnules cuneate decurrent entire or lobed toothed, sori intramarginal at the apex of the lobes and occupying their whole breadth.—*Dry. in Linn. Trans. v.* iii. *p.* 43, *tab.* 11. *Sw. Syn. Fil. p.* 119. *Schkh. Fil. p.* 106, *t.* 114. *All. Cunn. Fl. N. Zel. l. c. p.* 366. L. viridis, *Colenso. n.* 299; *and in Tasman. Journ.* ii. *p.* 174. Adiantum cuneatum, *Forst. Prodr. n.* 461. (*not* Lindsæa cuneata, *Willd.*)

Hab. New Zealand (Bay of Islands, *Mr. Menzies*). Northern Island, *All. Cunningham, Mr. Colenso, J. D. Hooker, Dr. Sinclair.*—Larger than the preceding (sometimes nearly a foot high, including the stipes), and much more compound, bipinnate and even tripinnate, segments and pinnules all wedge-shaped, confluent.

45. L. *microphylla*, Sw.; stipites short cæspitose, frond elongated oblong-lanceolate tripinnate, primary pinnæ distant, pinnules small broad cuneate toothed simple or bi-trifid, sori intramarginal, involucres toothed scarcely extending to the margins.—*Sw. Syn. Fil. p.* 120. *and* 319. *Willd. Sp. Pl.* v. *p.* 426. *Br. Prodr. p.* 156. *Hook. et Grev. Ic. Fil. t.* 194.

Hab. New Holland, about Port Jackson, abundant. *Sieb. Syn. Fil. n.* 117; Brisbane River, *All. Cunningham.*—A distinct and well marked species, with all the pinnules small and cuneate tapering into a kind of petiole: rachis flexuose.

46. L. *tenuis*, Kl.; "fronds bipinnate slender decumbent, stipes very slender chestnut-coloured shining and as well as the rachis flexuose somewhat twisted grooved above convex beneath, pinnæ distant alternate and opposite linear attenuated at the apex erecto-patent, pinnules minute distant obliquely ovate patent shortly petiolate the anterior margin oblique, superior one lobed or sinuato-crenate, lower margin convex, sori interrupted below the superior margin." *Klotzsch, in Linnæa*, 1844, *p.* 550.

Hab. British Guiana. *R. Schomburgk.*—No remarks on the affinities of this are given.

47. L. *cuneifolia*, Pr. " fronds ovato-triangular quadruplicato-pinnate tripinnate at the apex, primary and secondary pinnæ alternate acuminate, tertiary obtuse, pinnules cuneate truncate at the apex bi-trifid, sori linear continuous, rachis glabrous." *Presl, Reliq. Hænk.* 1, p. 60.

Hab. Island of Luzon. (*Presl.*)

Dubious species, or wholly unknown.

L. bilobata, *Pr.* name only.

L. truncata, *Pr.* name only, said to be a *Vittaria* of Gaudichaud, but I do not find such a species described.

L. pelacophylla, *Pr.* in Herb. Meyen.

L. securifolia, *Pr.* in Herb. Meyen.

L. brevifolia, *Reinw.* in Pr.

Subgen. II. Schizoloma, *Gaud.* *Veins more or less anastomosing, with no free veinlets in the areolæ.*—Sp. 48—60.

* *Fronds simple or only lobed.*

48. L. *cordata*, Gaud.; caudex creeping short, stipites tufted elongated, fronds coriaceous, sterile ones ovato-cordate obtuse entire, fertile linear-lanceolate or tripartite with the segments linear-lanceolate, costa prominent beneath, veins reticulated, sorus continuous the whole length of each margin. (Tab. LXVI. A.) Schizoloma cordatum, *Gaud. Ann. Sc. Nat.* 1824, *p.* 507; *in Freyc. Voy. p.* 179, *t.* 16.

Hab. Rawak in the Moluccas, *Gaudichaud.* New Guinea, *Hinds.*—A highly peculiar and Acrostichum-like fern, apparently of very rare occurrence.

49. L. *Griffithiana*, Hook.; lax and flaccid, caudex creeping short, stipites shorter than the elongato-lanceolate simple membranaceous costate frond, veins reticulated, sorus continuous round the entire margin. (Tab. LXVIII. B.)

Hab. Mergui, East Indies, *Griffith.*—The caudex, in the only specimen I possess, bears 5 fronds, and all of them accord in the quite entire nature of the frond.

** *Fronds pinnate (or, when young, simple).* Sp. 49—56.

† *Costa central. Sori on both margins of the nearly equal pinnæ.* Sp. 49-54.

50. L. *pentaphylla*, Hook.; lax and flaccid, caudex creep-

ing short, stipites shorter than the pinnated membranaceous frond, pinnæ about 5-costate, lateral ones ovate-oblong obtuse, terminal one elongated lanceolate, veins reticulated, sorus continuous round almost the entire margin. (TAB. LXVII. A.)

Hab. New Holland, *Mr. Bynoe.*—This may possibly be a state of *L. ensifolia*, but the very short side pinnules are at variance with such an opinion.

51. L. *ensifolia*, Sw.; firm and rigid, caudex very short creeping, stipes (as well as the rachis) glabrous as long as, or longer than, the pinnated frond, pinnæ 5—13 linear-ensiform or lanceolate erecto-patent submembranaceous sterile ones subserrate, veins reticulated, sorus continuous round the whole margin.—*Sw. Syn. Fil. p.* 118, *t*, 137.

α. Fronds linear-ensiform obtuse. L. ensifolia, *Sw. Syn. Fil. p.* 118, *t.* 317. *Willd. Sp. Pl.* v. *p.* 420. *Hook. and Grev. Ic. Fil. tab.* III. Schizoloma ensifolium, *J. Sm.* Lindsæa lanceolata, *Labill. Pl. Nov. Holl.* ii. *p.* 98, *t.* 248, *f.* 1. *Br. Prodr. Nov. Holl. p.* 156. L. membranacea, *Kze. in Linnæa, v.* xviii, *p.* 121. L. pteroides, *Wall. Cat. n.* 2193. L. sublobata, *Kze. in Linnæa, v.* xviii, *p.* 121. Schizoloma Billardieri, *Gaud. in Freyc. Voy. Bot. p.* 380, *t.* 17. Pteris stricta, *Lam.* Pteris angulata, *Pr.* Pt. angustata, *Wall.*

β. pinnules very long attenuated. L. attenuata, *Wall. Cat. n.* 2192.

γ. pinnules broad-lanceolate attenuate. L. longipinna, *Wall. Cat. n.* 2194.

Hab. Chiefly the tropical parts of the Old World. Madagascar (*Kaulfuss*).—α. Mauritius, Ceylon, *Mrs. Gen. Walker, Macrae.* Malacca, and Khasiya, *Griffith.* Marianne Island, *Gaudichaud.* Singapore, *Dr. Wallich.* Northern coasts of New Holland, *Labillardière, Brown.* Port Natal, South Africa, *Gueinzius, (Kze.)*—β. Mauritius and Singapore.—γ. Tavoy, *Mr. Gomez.* Ceylon, *Mrs. Gen. Walker.* Malacca, *Cuming, n.* 369.—A very variable species in the length and breadth and acumination or bluntness of the pinnules. Professor Kunze has published an *L. membranacea*, from Port Natal; it has longer pinnules and is more membranaceous than the usual form of α. but is not otherwise distinct; and his *L. sublobata*, in the same work, l. c. is Cuming's, n. 369, and no way distinct from *L. ensifolia.*

52. L. *macrophylla*, Kaulf.; "fronds pinnated petiolate ovate-oblong entire obtuse equal, sori continuous all round the margin." *Kaulf, En. Fil. p.* 218, (*not Hook. Gen. Fil.*

Tab. 63, B, *which is a new species of* Adiantum, *nor Kze. Anal. Pterid. p.* 37, *t.* 25). Schizoloma macrophyllum, *Pr.*

Hab. Guiana *(Kaulfuss.)*—I must acknowledge myself to have committed a gross error in representing the fructification of the plant figured in the 'Genera Filicum,' Tab. LXIII. B, as a *Schizoloma*, Gaud. It was sent to me as the *L. macrophylla*, Kaulf., by M. Moricand: but a subsequent inspection has proved that we were deceived. By a singular reduplicature, if I may so call it, of the involucre of this plant, it assumes, even under a lens, at first sight, quite the appearance of a *Lindsæa*. On soaking a portion of a pinna the real structure is exhibited, and the fern proves to be a new species of *Adiantum*, (Hewardia, *J. Sm.*) It is, I think, more than probable that the learned author of 'Analecta Pteridographiæ' has been equally deceived with myself, for the plant he figures with the fructification of a *Lindsæa* is a Brazilian plant and apparently derived from the same source as mine. Kaulfuss' plant, however, let it be observed, is from French Guiana (not Brazil). It remains to be ascertained whether Kaulfuss himself was not in a similar manner misled, and whether the fructification of the original species is not that of *Adiantum*. If it is not so, I can only say I am totally unacquainted with the true *L. macrophylla*; and I am not aware that any botanist since the time of Kaulfuss has noticed it. *L. macrophylla*, according to that author, is a very striking plant. "Caudex a foot high, frond 7 inches long, pinnæ 5—7, 3 inches long, an inch or more broad." In everything but the fructification (supposing Kaulfuss to be correct on that point) our plant of the 'Genera Filicum' quite accords with *L. macrophylla* Kaulf.

53. L. *Gueriniana*, Gaud. MSS.; caudex slightly creeping scaly, stipes rather long and rachis terete, frond lanceolate pinnate, pinnules nearly horizontal approximate subcoriaceous opaque ovate acute subfalcato-incurved obscurely serrate, the superior base truncate and subauriculate, the sides nearly equal, costa and reticulated veins immersed obsolete, sorus continuous occupying both margins.—Schizoloma Guerinianum, *Gaud. in Freyc. Voy. p.* 380, *t.* 18.

Hab. Moluccа Islands (Rawak), *Gaudichaud.* Island of Celebes, *Herb. Norris, (J. Smith).*—Ten inches to a foot or more high, including the stipes, which is about equal in length to the frond. It is a very distinct species and apparently very rare. Its pinnæ are about 3-4ths of an inch long, smaller upwards, and they are deciduous at a joint as in *L.* (Isoloma) *lanuginosa*, Wall. Gaudichaud notices on the epidermis of the pinnæ minute microscopic scales, which in the living state have a whitish furfuraceous appearance.

54. L. *Fraseri*, Hook.; caudex creeping scaly, stipites much shorter than the elongated linear-oblong pinnated frond, pinnæ thin membranaceous nearly opposite remote cordato-ovate obliquely cuneate at the base obtuse obscurely lobed serrated partially reticulated, main vein or costa central

upper pinnæ gradually smaller and subtrapezoid, sori marginal interrupted. (Tab. LXX. B.)

Hab. North coast of New Holland, Stradbroke Island, *Fraser*. Port Essington, *All. Cunningham*.—Mr. J. Smith has suggested that this may be a state of *L. heterophylla*, Dry.; but my specimens from Mr. Fraser and those of Mr. Smith from Mr. Allan Cunningham are so perfect and uniform and so different from that species that I am unwilling to unite them. Here the stipes (dark brown below) is shorter than the frond, the latter being 8—10 inches or almost a foot long, rachis straw-coloured slender, pinnæ remote, except the uppermost ones, generally opposite or nearly so, remote, membranaceous, pellucid, the largest of them about three-quarters of an inch long.

†† *Costa excentric marginal or obsolete. Sori on the superior margin of the unequal pinnæ.* (Synaphlebium, *J. Sm.*), Sp. 55, 56.

55. L. *intermedia*, Hook.; stipes longer than the frond tetragonous, frond oblong pinnated, pinnæ rhomboideo-lanceolate submembranaceous rather rigid reticulate, inferior half obliquely cut out to the costa, the rest of the pinnæ with the costa or principal vein central, sorus continued round the margin except in the lower base. (Tab. LXVII. B.)

β. *minor*; Synaphlebium recurvatum, *J. Sm. in Lond. Bot. Journ. v.* iii. *p.* 415 (*name only*), *excl. the syns.*

Hab. Phillipine Islands, *Cuming, n.* 464; and β. Malacca, *n.* 392.—This is another instance, in my opinion, of the instability of the Genus *Synaphlebium* (J. Sm.), as distinguished from *Schizoloma* (supposing that itself to be a good Genus). In the present instance one-half of the pinnæ is indicative of the former Genus, the other of the latter. There is probably an error in numbering some of Mr. Cuming's specimens of this fern. His n. 404, according to Mr. J. Smith, is a true *Lindsæa*, which he refers to *L. decomposita*, and seems to answer to my n. 405, which I have referred to *L. scandens*, Hook. Mr. Cuming's n. 392 is a small var. of this species which Mr. J. Smith refers to *L. recurvata*, Reinw.

56. L. *recurvata*, Wall.; caudex creeping, stipites tufted longer than the frond tetragonous, frond oblong pinnated, pinnæ oblong very obtuse recurvato-falcate subcoriaceo-membranaceous reticulated, the superior base truncate, the costa forming the lower margin, sorus continued along the upper margin and to the very apex. (Tab. LXX. A.) L. recurvata, *Wall. Cat. n.* 149; *Reinw. MSS.* (*not* Synaphlebium recurvatum, *J. Sm.*) L. nitens, *Bl. En. Fil. Jav. p.* 217. L. serpens, *Wall. Cat. n.* 150.

Hab. Singapore, *Dr. Wallich*. Java, *Reinwardt*. Malacca, Penang, *Griffith*.—Nearly allied to the preceding (*L. intermedia*), but the apex of the pinnæ is very obtuse, and the lower margin curved downwards (more or less) for its whole length, while that whole length is

occupied by the costa, and no portion of the costa is distant from the margin. It is probably the *L. nitens* of Blume, a name it scarcely merits; and being thus doubtful, I prefer the more appropriate one of Wallich, and it seems to be the same species to which Reinwardt has given the same name adopted by Presl, who, however, refers it to *Lindsæa*, though it properly belongs to his *Schizoloma*.

**** Fronds bipinnate or decompound.* Sp. 57—60.

57. L. *heterophylla*, Dry.; frond lanceolate or deltoid pinnate with pinnules pinnatifid or bipinnate, pinnæ or pinnules lanceolate or rhomboid — cuneate or nearly orbicular petiolate or sessile subcoriaceous membranaceous opaque, veins both forked and reticulated, sori continuous.

α. frond lanceolate pinnate, pinnæ mostly rhomboid-lanceolate. L. heterophylla, *Dry. Linn. Trans. v.* iii. *p.* 41, *t.* 8, *f.* 1. L. variabilis, *Hook. et Arn. Bot. of Beech. Voy. t.* 52, (*right hand figure*).

β. frond deltoid, lower pinnules elongated pinnatifid. Schizoloma heterophyllum, *J. Sm. in Hook. Journ. of Bot.* iii. *p.* 414.

γ. frond broad lanceolate mostly bipinnate, pinnules suborbicular small, terminal ones generally lanceolate often pinnatifid at the base. L. variabilis, *Hook. et Arn. Bot. of Beech. Voy. p.* 257, *t.* 52, (*left hand figure*). L. Finlaysoniana, *Wall. Cat. n.* 2197.

Hab. *α.* Malacca, *Robertson, (Dryander).*—*β.* Luzon, *Cuming, n.* 275. —*γ.* Singapore, *Wallich.* Isle of Loo Choo, *Beechey.*—Appropriate as Dryander's name is for the original species, it becomes still more so now that other states of it are detected. Mr. Dryander's plant is the more simple form, merely pinnated; the plant figured as *L. variabilis* in the Botany of Beechey's Voyage above quoted, left hand figure, is an intermediate state, and the *L. Finlaysoniana* of Wallich is the most compound of all. The pinnæ or pinnules vary from orbicular (small and ecostate) to lanceolate (large in proportion) with a central costa, and the veining is as variable as the pinnules, sometimes forked and not uniting, sometimes anastomosing.

58. L. *propinqua*, Hook.; stipes tetragonous about as long as the frond, frond bipinnate ovato-acuminate in circumscription, pinnæ 5—7 oblong-lanceolate terminal one elongated, pinnæ thin membranaceous reticulated oblong subtrapezoid, the apex rounded the base obliquely cuneate tapering into a short petiole, the lower margin formed by the costa, upper margin crenato-lobate, sori interrupted. (Tab. LXVI. B.) *Hook. in Nightingale's Oceanic Sketches, App. p.* 130.

Hab, Navigator Islands, *Sir T. Nightingale.*—A very distinct species

from any previously described, with singularly thin, membranaceous pinnules, the sterile ones much more deeply lobed than the fertile ones.

59. L. *obtusa*, J. Sm.; caudex creeping, stipes tetragonal twice or thrice longer than the frond, frond pinnate broadly ovate or subdeltoid, pinnæ 4 — 5 oblong-lanceolate subcoriaceo-membranaceous firm reticulated, pinnules oblong somewhat 4-angled rarely subrecurvo-falcate apex very obtuse, superior base truncate, the lower margin formed by the costa, superior margin slightly lobed, sori broad interrupted.—Synaphlebium obtusum, *J. Sm. in Hook. Journ. Bot. p.* 415, (*name only*).

Hab. Malacca, *Cuming, n.* 394.—Allied to the preceding, but different in the much smaller size, firmer texture, dissimilar shape of the pinnules, which, however, form almost an exact parallelogram in most instances with 4 somewhat acute angles, copious and broad sori, interrupted indeed but placed close together in consequence of the proximity of the lobes.

60. L. *davalloides*, Bl.; caudex creeping, stipes and rachis long tetragonous glabrous, stipites tufted, frond subdeltoid-ovate bipinnate, pinnæ erecto-patent lanceolate acuminate, pinnules dimidiato-oblique membranaceous reticulated (reticulations few) the apex obtuse, superior base truncate, costa at the inferior margin, superior margin rather deeply but irregularly lobed, sori interrupted linear confined to the apices of the lobes. (TAB. LXVIII. A.)—*Bl. En. Fil. Jav. p.* 218. *Kze. in Schkh. Fil. Suppl. p.* 12, *t.* 7, (*sori not accurate*). L. lobata, *Wall. Cat. n.* 152. Davallia Kunziana, *Hook. supra, p.* 177.

Hab. Singapore, *Wallich*, 1822, *T. Lobb.* Java, *Blume*, *T. Lobb*, (*Herb. Jav. n.* 216.) Malacca, *Griffith.*—Misled by Kunze's figure of the fructification of this plant, I was induced to refer it to *Davallia*, at page 177 of this work: but now that I find it is the *L. lobata* of Wallich, and that I have recently received fine specimens from Java, gathered by Mr. Thos. Lobb, I am happy to be able to restore it to its proper genus, *Lindsæa*, sect. Schizoloma (*Gaud.*), or Synaphlebium (*J. Sm.*) It is a well-marked and very handsome species, of a light green colour.

2. DICTYOXYPHIUM, *Hook.*

Sorus marginal, linear, continuous, double. *Involucre* opening outwardly, formed of 2 linear membranes, of which the inferior one may be considered accessory, uniting many veins. — *Tropical* Fern. Rhizoma *simple, thick.* Fronds *cæspitose, simple, elongated, ensiform, coriaceo-membranaceous* (*fertile ones narrower*), *attenuated at the base into a short* stipes, *costate.* Costa *central strong, promi-*

nent on both sides. Veins *internal, transverse, subapproximate, flexuose, very much branched.* Veinlets *anastomosing copiously into unequal somewhat* 6*-sided areoles; the* areoles *bearing forked veins, whose ultimate branchlets are free, and clavate at the apex.*

1. D. *Panamense*, Hook. *Gen. Fil. Tab.* 62.

Hab. Isthmus of Panama, coast of the Pacific, *Cuming*, *n.* 1124. New Grenada, *Purdie.*—A very rare and singular fern, with the habit of *Vittaria*, but broader than any known species and more rigid, fructification of a *Lindsæa*, and with the venation of *Amphiblestra* among the *Adiantum* group, or *Gymnopteris* among the *Acrostichum* group. The fronds are 2 to 3 feet long and more, the sterile ones much broader than the fertile, but the sterile sometimes become fertile towards the apex.

END OF VOL. I.

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Ilvensis, *Br.* - - 63
incisa, *H. & Grev.* - 202
incisa, *Gill.* - - 63
Mexicana, Br. - 60
mollis, *J. Sm.* - 60
obtusa, *Hook.* 62, 201
Perriniana, H. & Grev. 48
Peruviana, H. & Grev. 63

EDWARD NEWMAN, PRINTER, 9, DEVONSHIRE STREET, BISHOPSGATE.

ERRATA.

At Page 150, for SUBORD. III. read TRIBE III.

„ „ and on line the eighteenth from the bottom, for "Suborder of ferns" read *Tribe of ferns.*

Tab. I.

A. Gleichenia Speluncæ, *Br.*—p. 2.

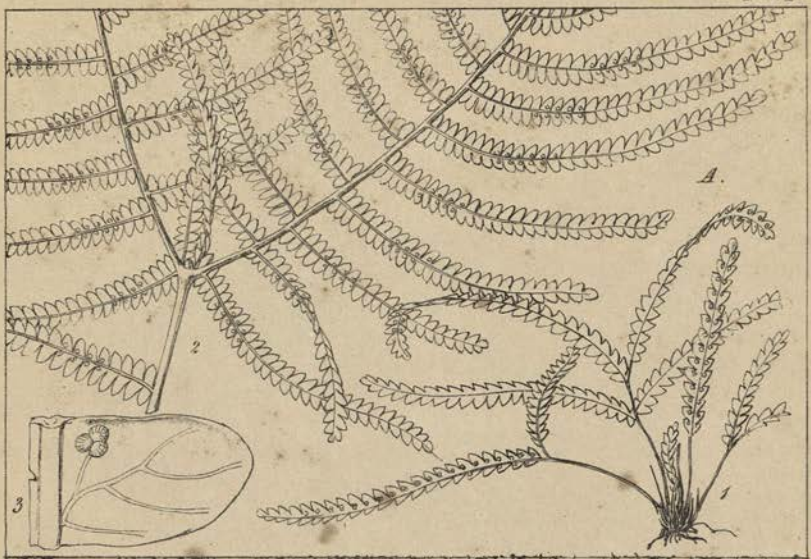
Fig. 1. Small entire plant, *nat. size.* Fig. 2. Portion of a larger frond. Fig. 3. Fertile segments, *magnified.*

B. Gleichenia rupestris, *Br.*—p. 2.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Fertile segment; *magnified.*

C. Gleichenia dicarpa, *Br.*—p. 3.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Upper side of a fertile portion of a pinna; and Fig. 3. Lower side of ditto; *magnified.* Fig. 4. Single segment; *more magnified.*


A.
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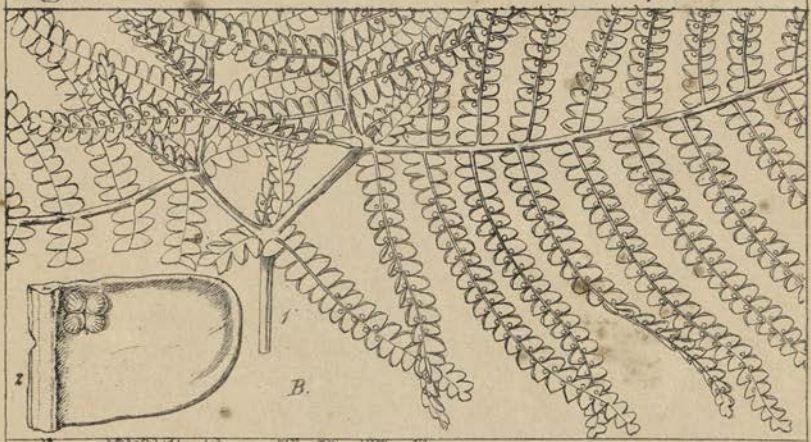
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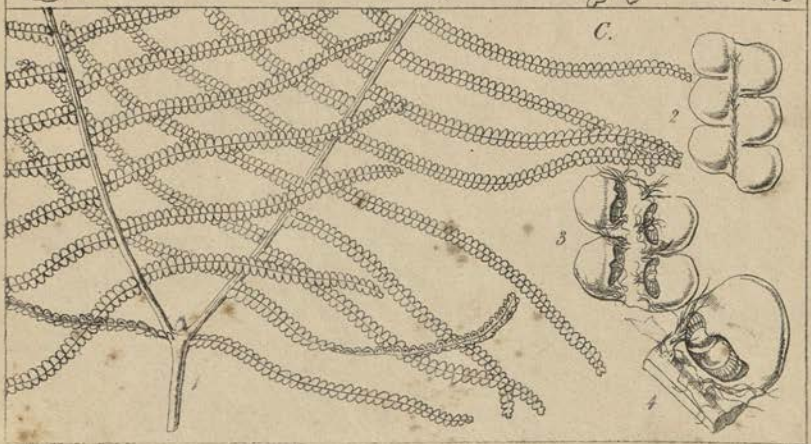
C.
2
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4
1

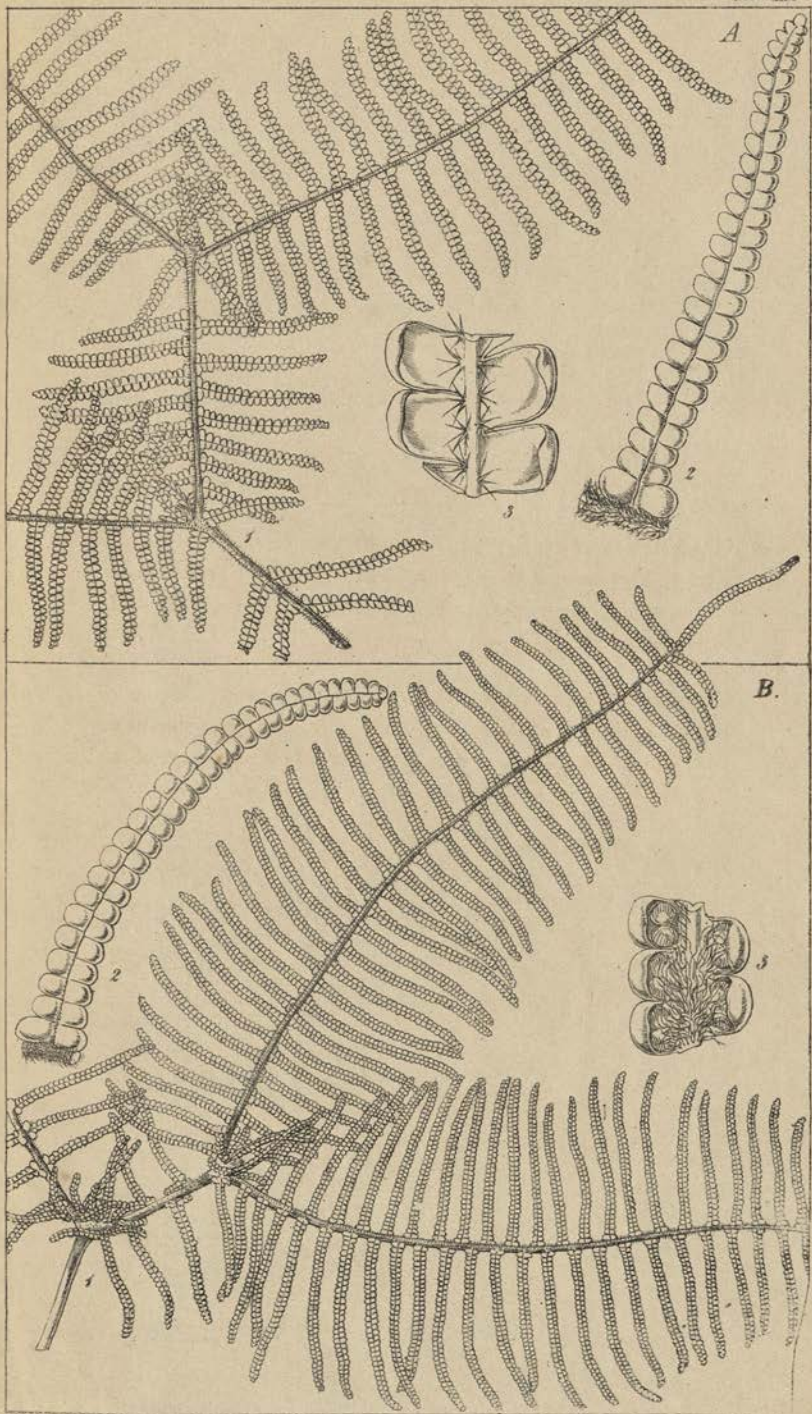
Tab. 11.

A. Gleichenia semivestita, *Lab.*—p. 3.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Upper side of a pinna; *magnified.* Fig. 3. Lower side of a portion of a pinna (sterile); *more magnified.*

B. Gleichenia hecistophylla, *All. Cunn.*—p. 4.

Fig 1. Portion of a frond; *nat. size.* Fig. 2. Upper side of a pinna; *magnified.* Fig. 3. Under side of a portion of a fertile pinna; *more magnified.*


A
1
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B.
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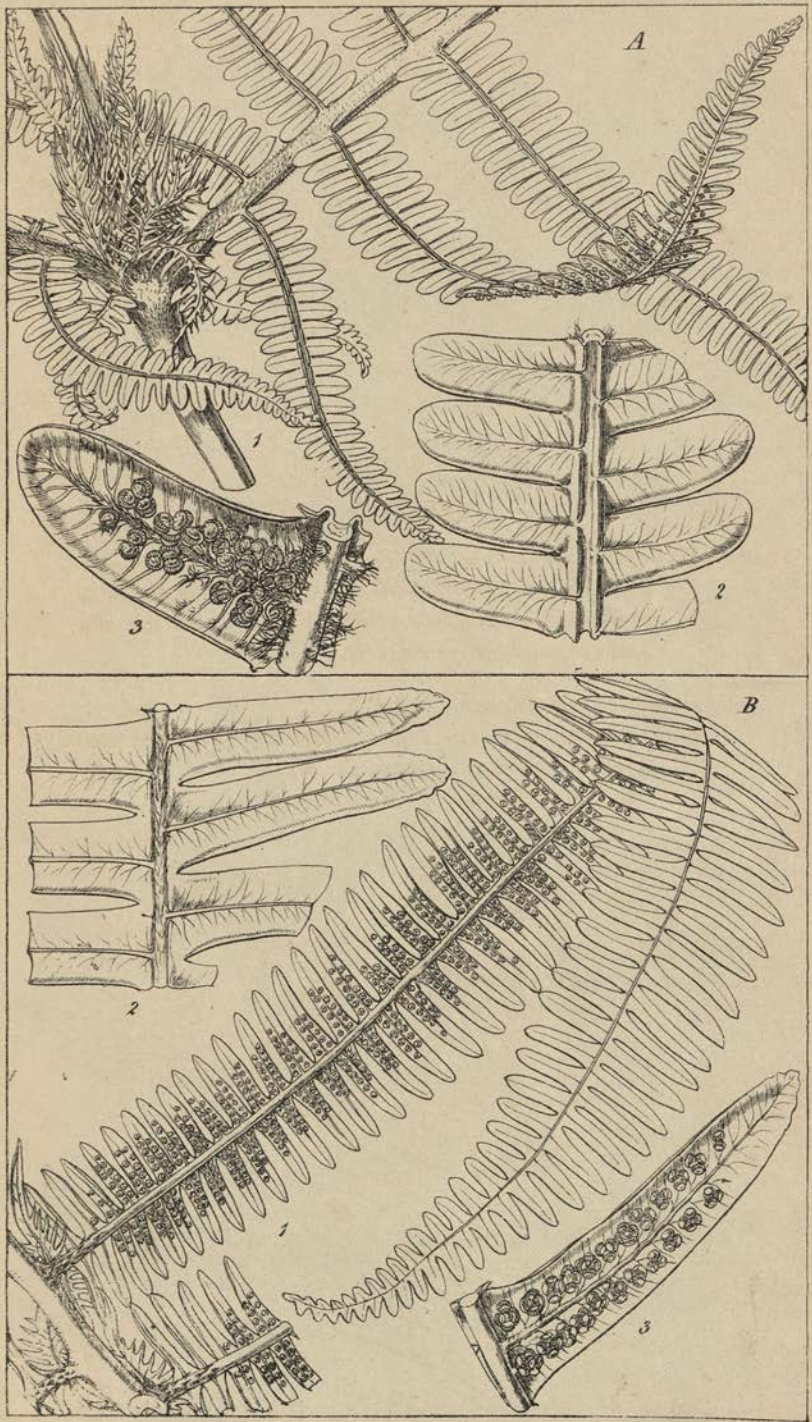
Tab. III.

A. Gleichenia gigantea, *Wall.*—p. 5.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Upper side of portion of a pinna; *magnified.* Fig. 3. Under side of a fertile segment; *more magnified.*

B. Gleichenia glauca, *Sw.*—p. 4.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Upper side of a portion of a pinna; *magnified.* Fig. 3. Under side of a fertile segment; *more magnified.*


A
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B
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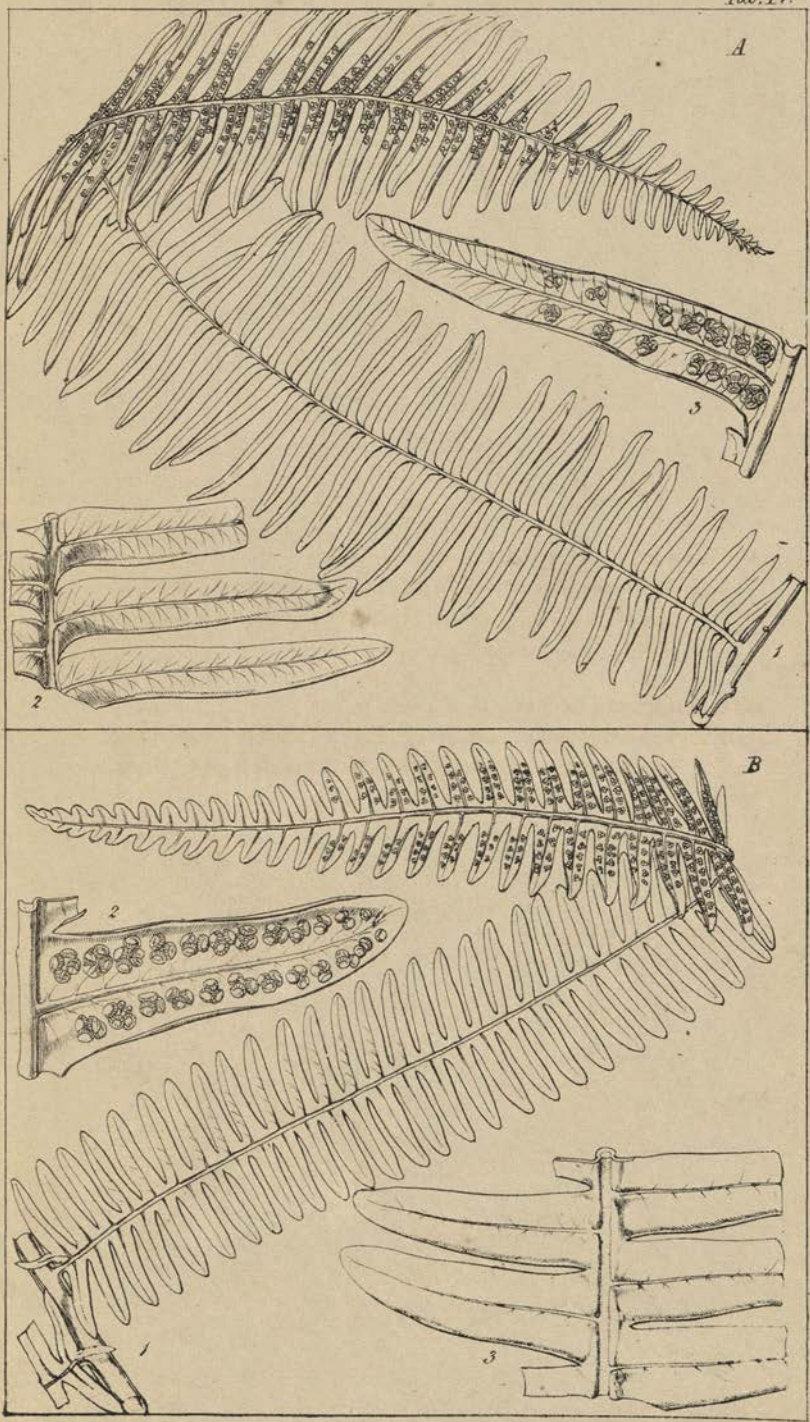
Tab. IV.

A. Gleichenia Bancroftii, *Hook.*—p. 5.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Upper side of a portion of ditto; *magnified.* Fig. 3. Under side of a segment of ditto; *more magnified.*

B. Gleichenia excelsa, *J. Sm.*—p. 5.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Under side of a segment of ditto; *magnified.* Fig. 3. Upper side of a portion of a pinna; *magnified.*


A
3
2
1
B
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1
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Tab. V.

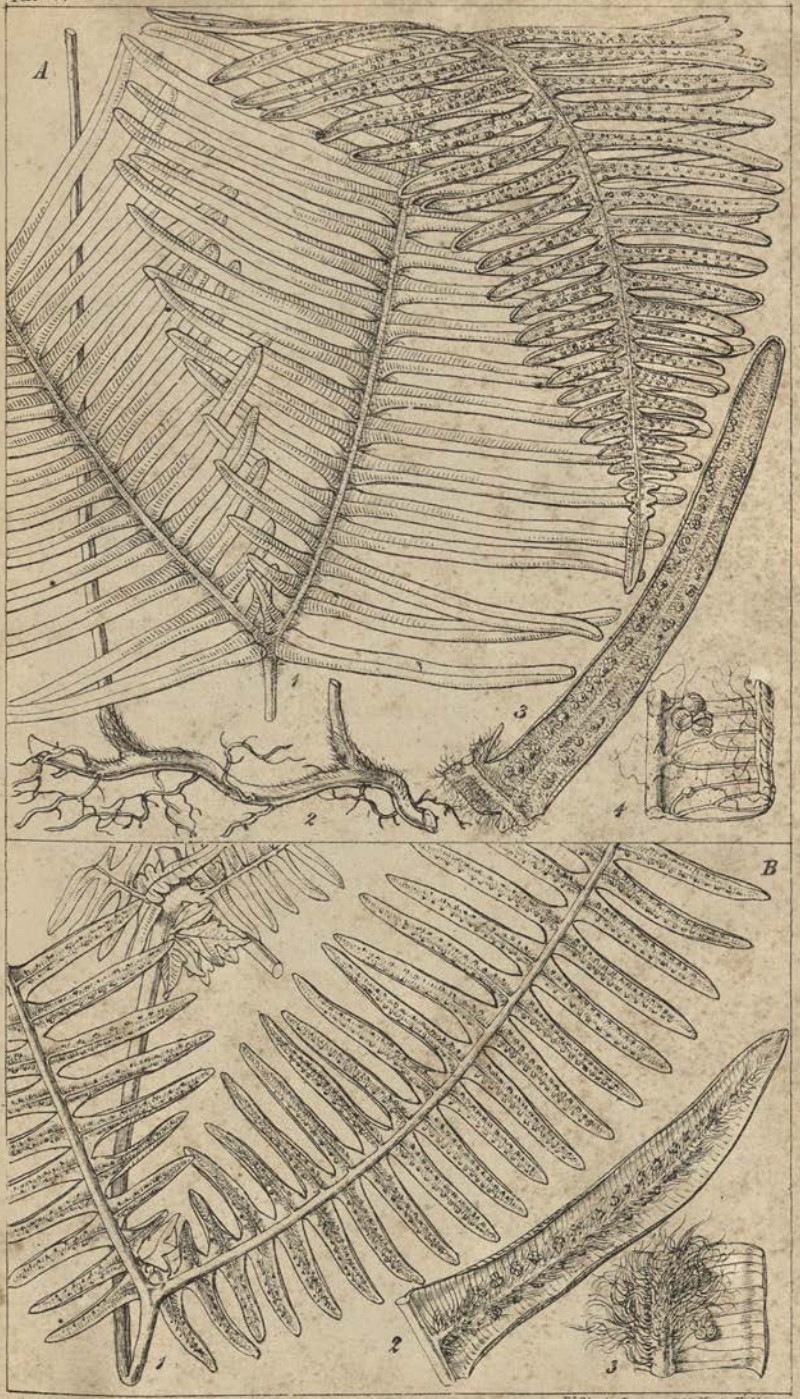
A. Gleichenia nervosa, *Kaulf.*—p. 12.

Fig. 1. Fertile segment, under side; *nat. size.* Fig. 2. Portion of the same; *magnified.* Fig. 3, 4. Frond, nearly entire; *nat. size.*

B. Gleichenia Klotzschii, *Hook.*—p. 13.

Fig. 1. Fertile segment, under side; *magnified.* Fig. 2. Portion of the same; *more magnified.* Fig. 3. Portion of a frond; *nat. size,*

Tab: V.



W. Clark, Print. 202 H. Holborn

Tab. VI.

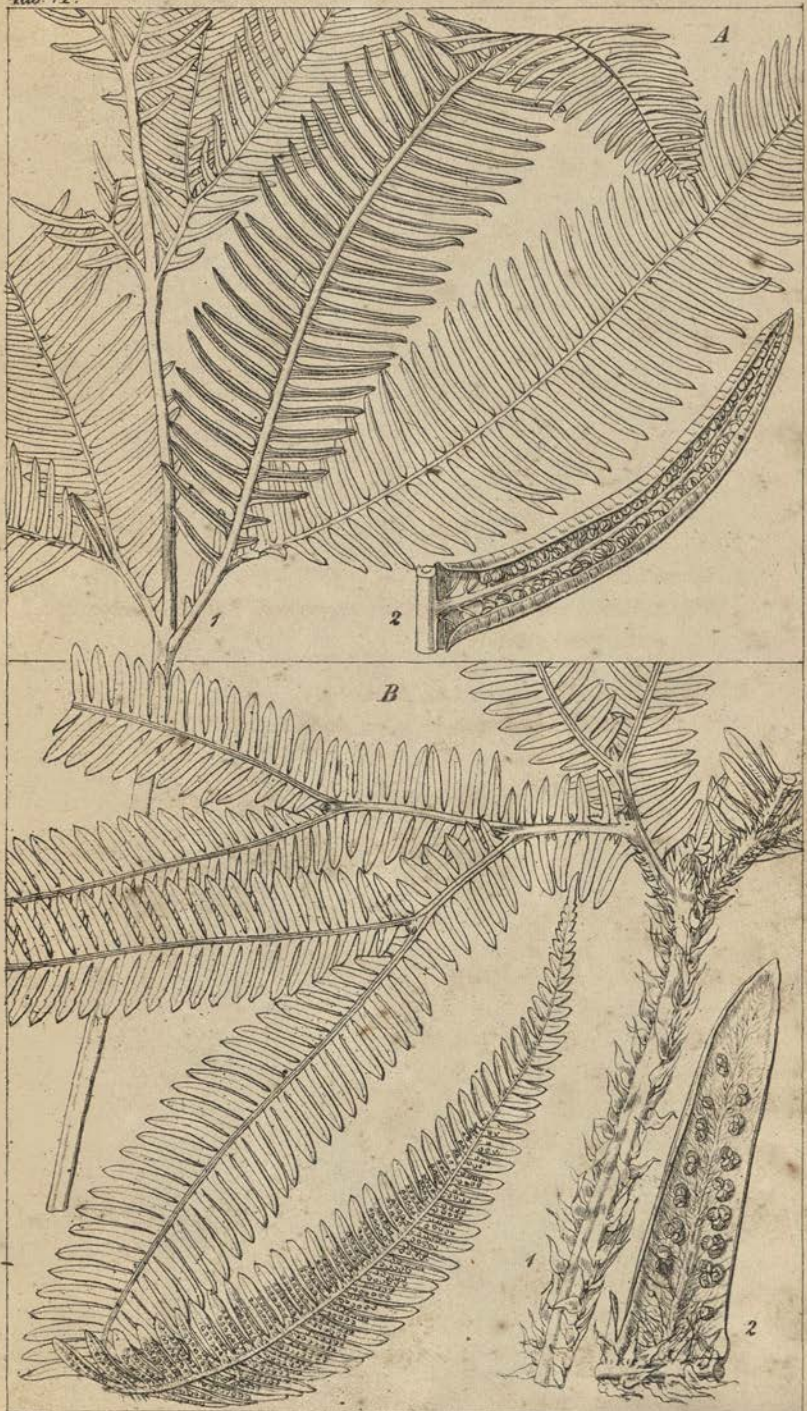
A. Gleichenia cryptocarpa, *Hook.*—p. 7.

Fig. 1. Fertile segment, under side; *magnified.* Fig. 2. Nearly entire frond; *nat. size.*

B. Gleichenia Cunninghami, *Hew.*—p. 6.

Fig. 1. Fertile segment, under side; *magnified.* Fig. 2. Portion of a frond; *nat. size.*

Tab. VI.



W. Fitch. lith.

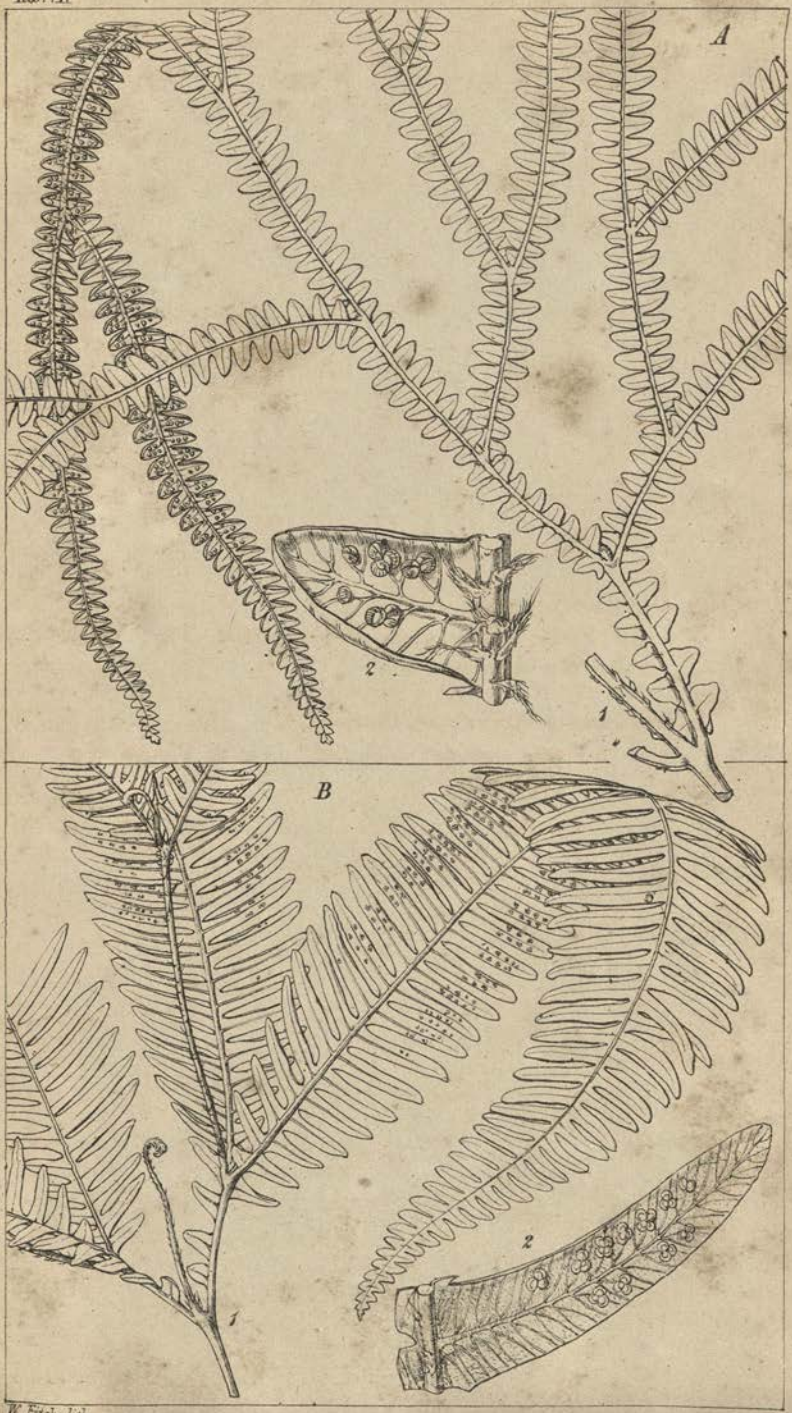
Tab. VII.

A. Gleichenia revoluta, *H. B. K.*—p. 7.

Fig. 1. Fertile segment, under side; *magnified.* Fig. 2. Portion of a frond; *nat. size.*

B. Gleichenia Mathewsii, *Hook.*—p. 9.

Fig. 1. Fertile segment; *magnified.* Fig. 2. Portion of a frond; *nat. size.*



W. Fitch, lith.

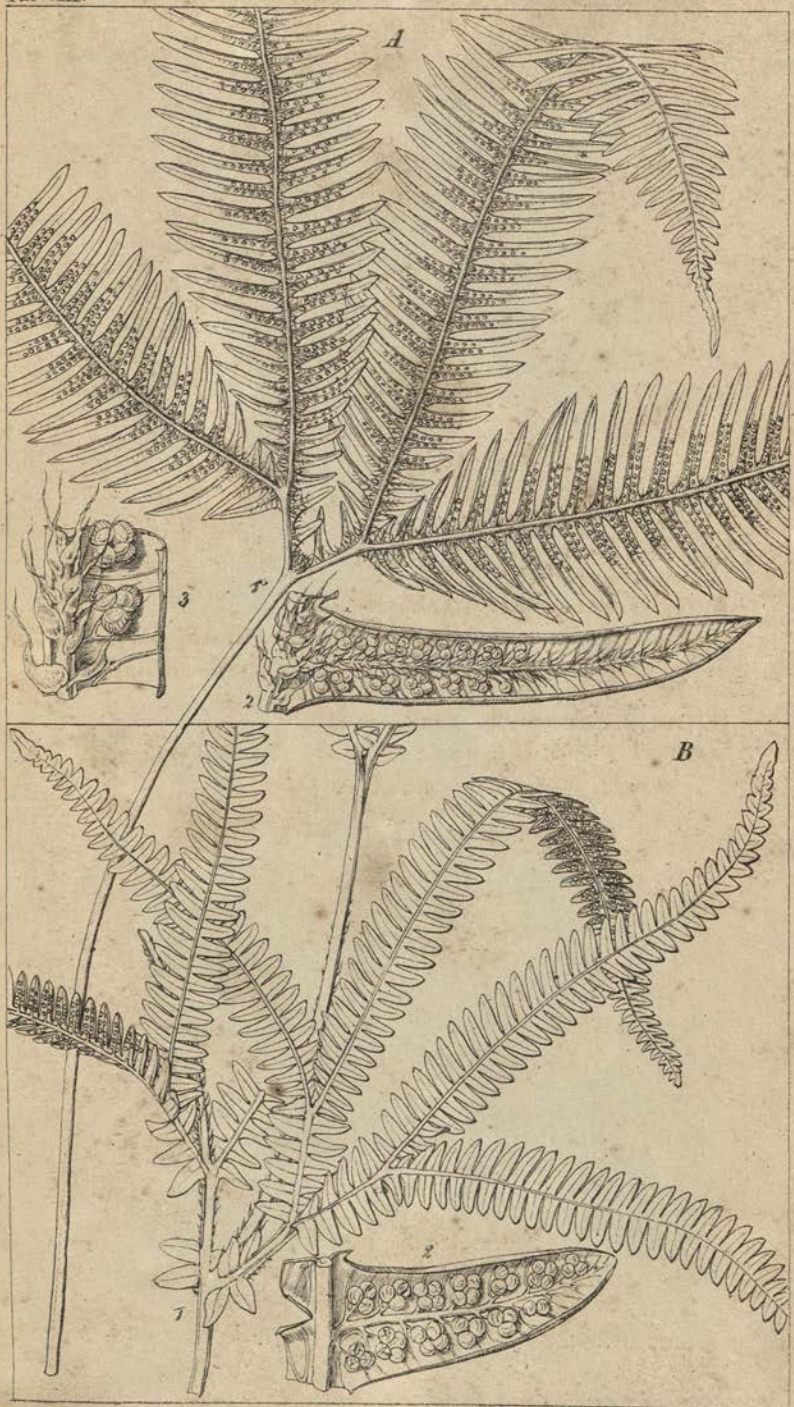
Tab. VIII.

A. Gleichenia acutifolia, *Hook.*—p. 7.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. under side of a segment; *magnified.* Fig. 3. Portion of ditto; *more magn.*

B. Gleichenia pedalis, *Kaulf.*—p. 6.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Fertile segment, under side; *magnified.*



W. Clerk, Printer 201 High Holborn.

Tab. IX.

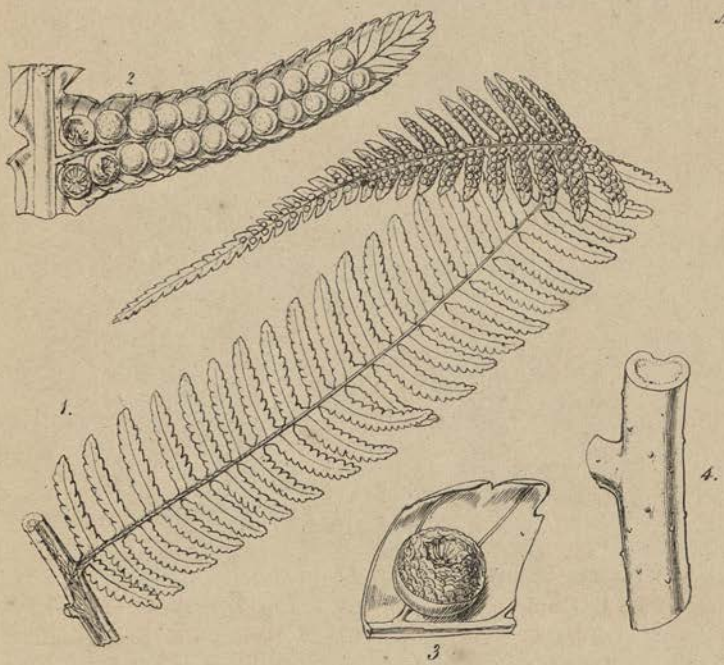
A. Cyathea Serra, *Willd.*—p. 17.

Fig. 1. Fertile pinnæ; *nat. size.* Fig. 2. Segment of ditto, under side; *magnified.* Fig. 3. Sorus; *more magnified.* Fig. 4. Portion of the stipes and rachis; *nat. size.*

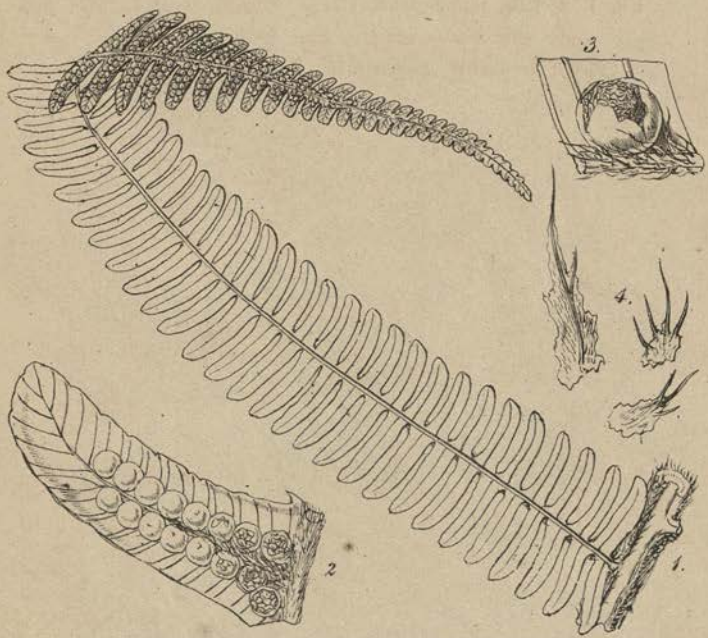
B. Cyathea Imrayana, *Hook.*—p. 18.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Segment of ditto, under side; *magnified.* Fig. 3. Sorus. Fig. 4. Scales from the rachis; *magnified.*

A.



B.

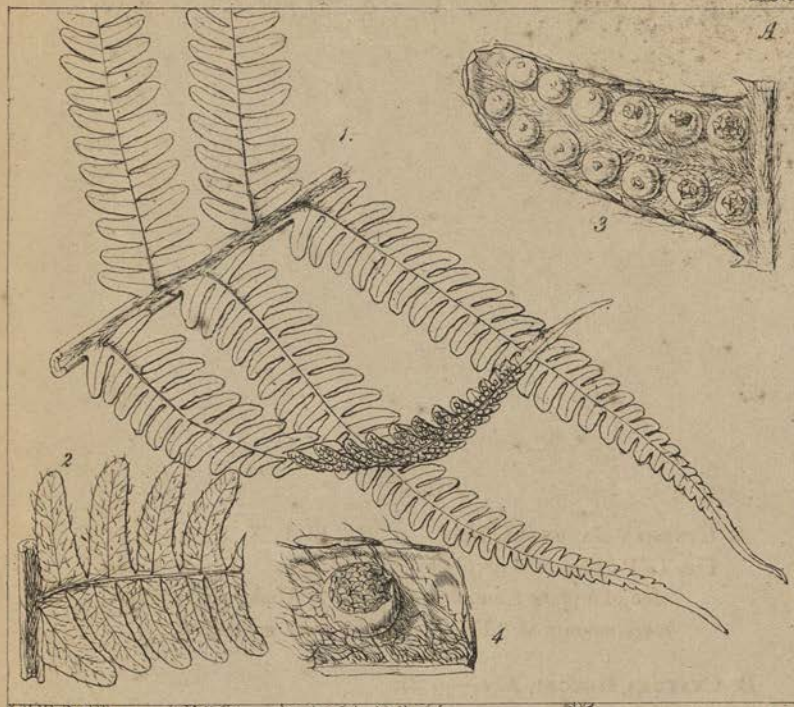


Tab. X.

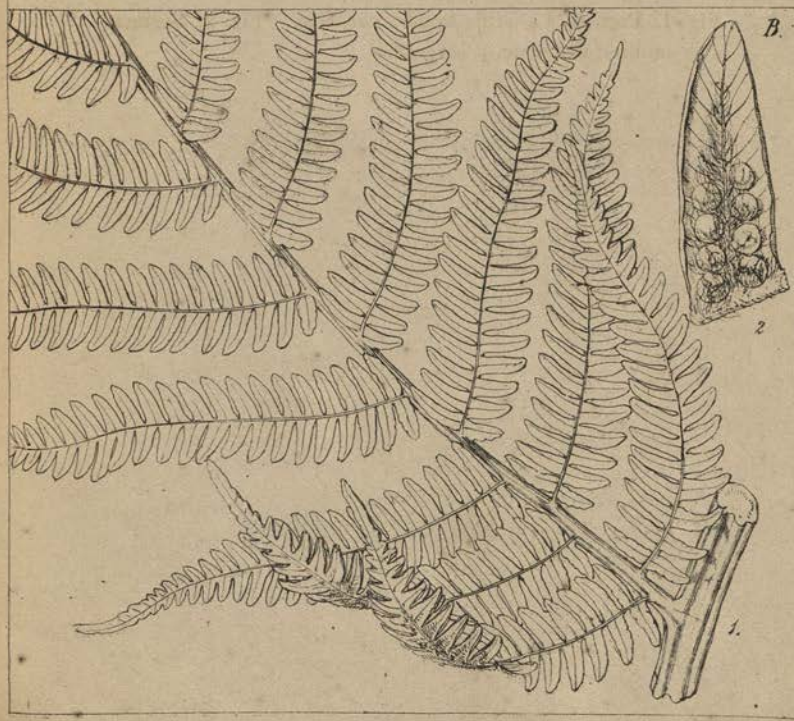
A. Cyathea Gardneri, *Hook.*—p. 21. (Tab. X. B. in text).
Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Upper side of a pinna; *magnified.* Fig. 3. Under side of ditto; *more magnified.* Fig. 4: Sorus; *more magnified.*

B. Cyathea Dregei, *Kze.*—p. 23.
Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Segment of ditto, under side; *magnified.*

A.



B.



Tab. XI.

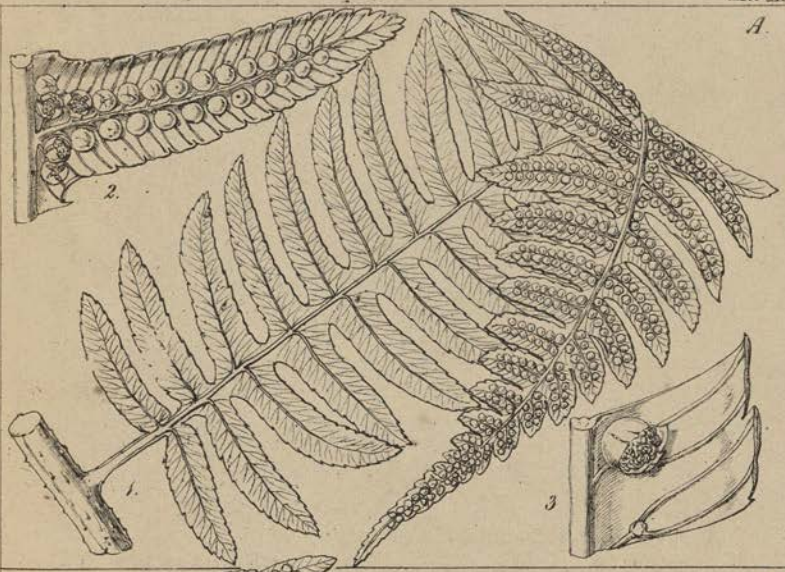
A. Cyathea divergens, *Kze.*—p. 19.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Segment of ditto, under side; *magnified.* Fig. 3. Portion of a fertile segment with a sorus; *more magnified.*

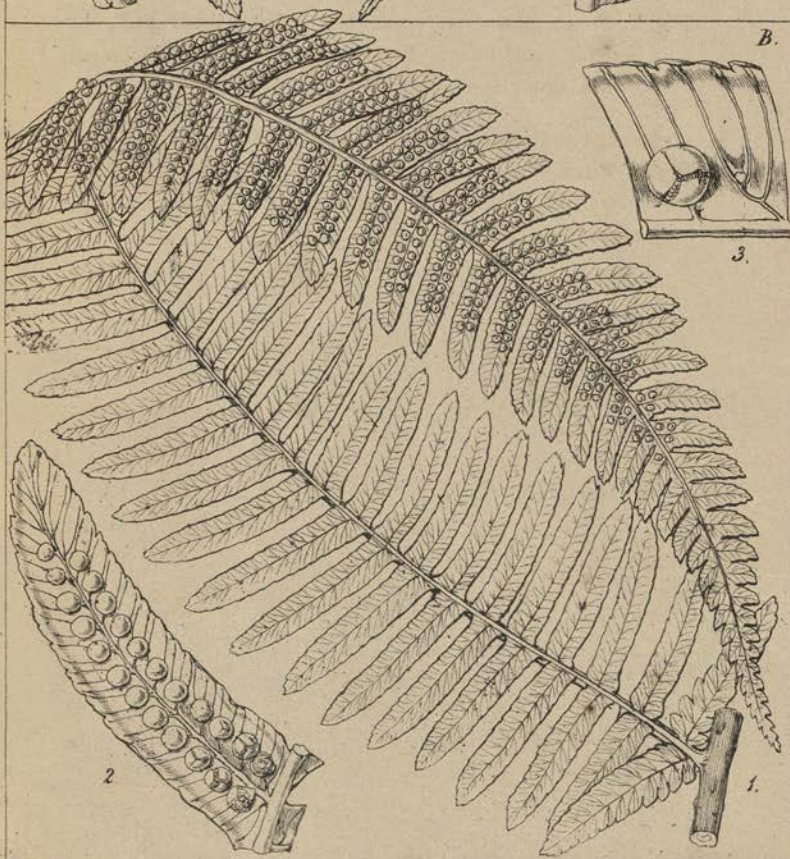
B. Cyathea canaliculata, *Willd.*—p. 23.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Portion of ditto, with a sorus; *more magnified.*

A.



B.



W. Fitch, lith.

Tab. XII.

A. Cyathea cuspidata, *Kze.*—p. 19.

Fig. 1. Fertile pinna: *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Portion of ditto, with a sorus; *more magnified.*

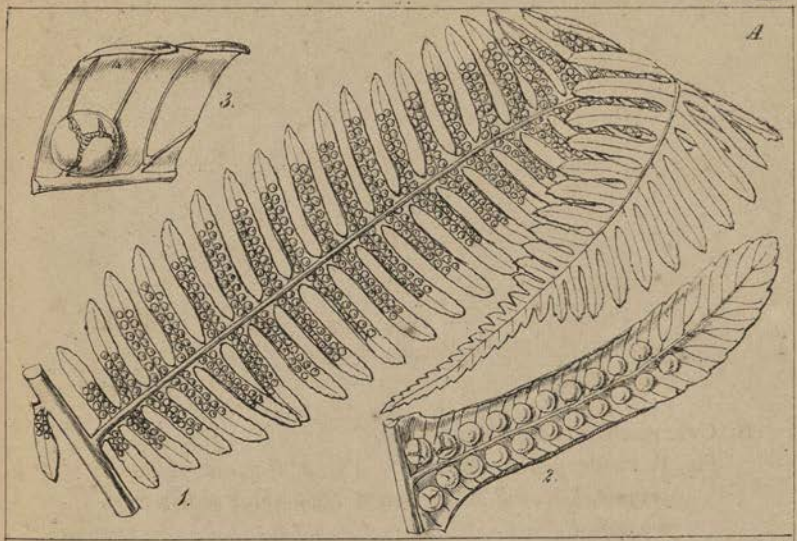
B. Cyathea excelsa, *Sw.*—p. 24.

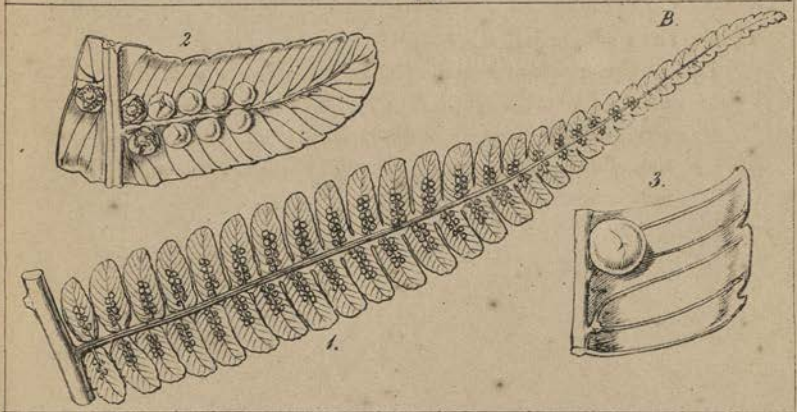
Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Portion of ditto, with a sorus; *more magnified.*

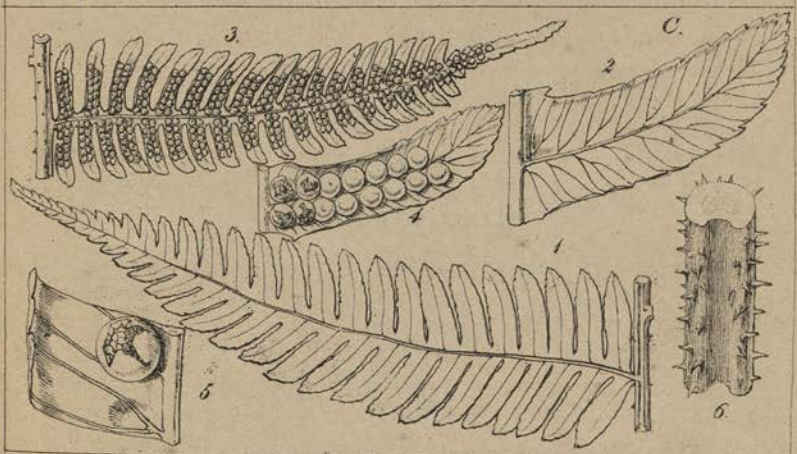
C. Cyathea spinulosa, *Wall.*—p. 25.*

Fig. 1. Upper side of a sterile pinna; *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Fertile pinna, *nat. size.* Fig. 4. Segment of ditto; *magnified.* Fig. 5. Portion of ditto, with a sorus. Fig. 6. Portion of the stipes; *nat. size.*

* By mistake the reference to this plate is given as Tab. XIV. C. — The reader is requested to correct this error with a pen.







W. Clark, Printer, 253, High Holborn

Tab. XIII.

A. Cyathea canaliculata, γ. latifolia, *Hook.*—p. 24.
Pinna; *nat. size.* Fig. 1. Portion of a fertile pinnule; *magnified.* Fig. 2. Sorus; and Fig. 3. sorus further advanced; *more magnified.*

B. Hemitelia speciosa, *Kaulf.*—p. 28.
Pinna; *nat. size.* Fig. 1. Portion of ditto: *magnified.* Fig. 2. Sorus; *magnified.* Fig. 3. Receptacles and involucre; *magnified.*

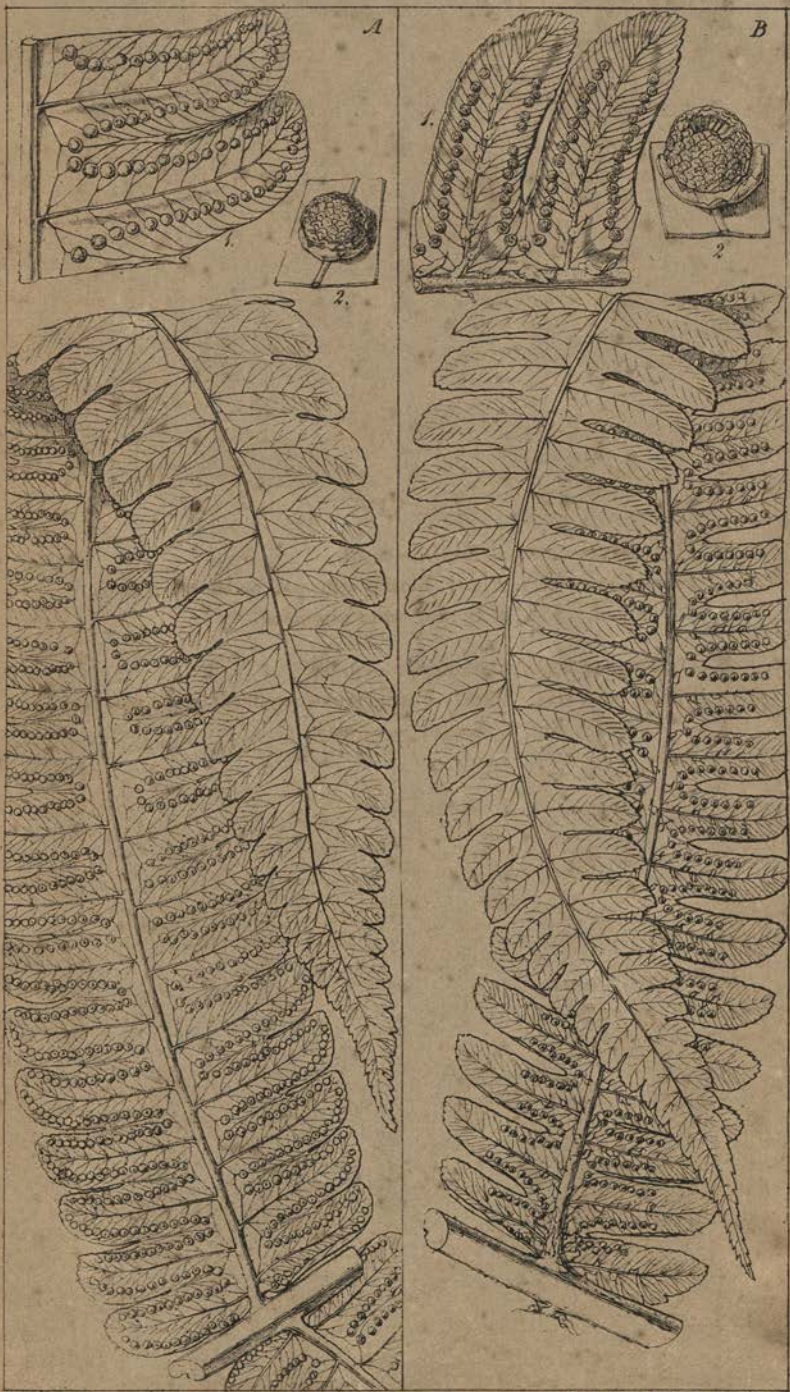
W. Fitch, lith.

Printed by W. Clark, 201, High Holborn.

Tab. XIV.

A. Hemitelia obtusa, *Kaulf.*—p. 29.
Pinna; *nat size.* Fig. 1. Fertile segments, under side; *magnified.* Fig. 2. Sorus; *more magnified.*

B. Hemitelia grandifolia, *Spr.*—p. 30.
Pinna; *nat. size.* Fig. 1. Fertile segments, under side; *magnified.* Fig. 2. Sorus; *more magnified.*



W. Fitch. lith.

Printed by W.Clerk 202 High Holborn.

Tab. XV.

Hemitelia horrida, *Br.*—p. 30.

Pinna; *nat. size.* Fig. 1. Portion of fertile segments; *magnified.* Fig. 2. Sorus; *more magnified.*

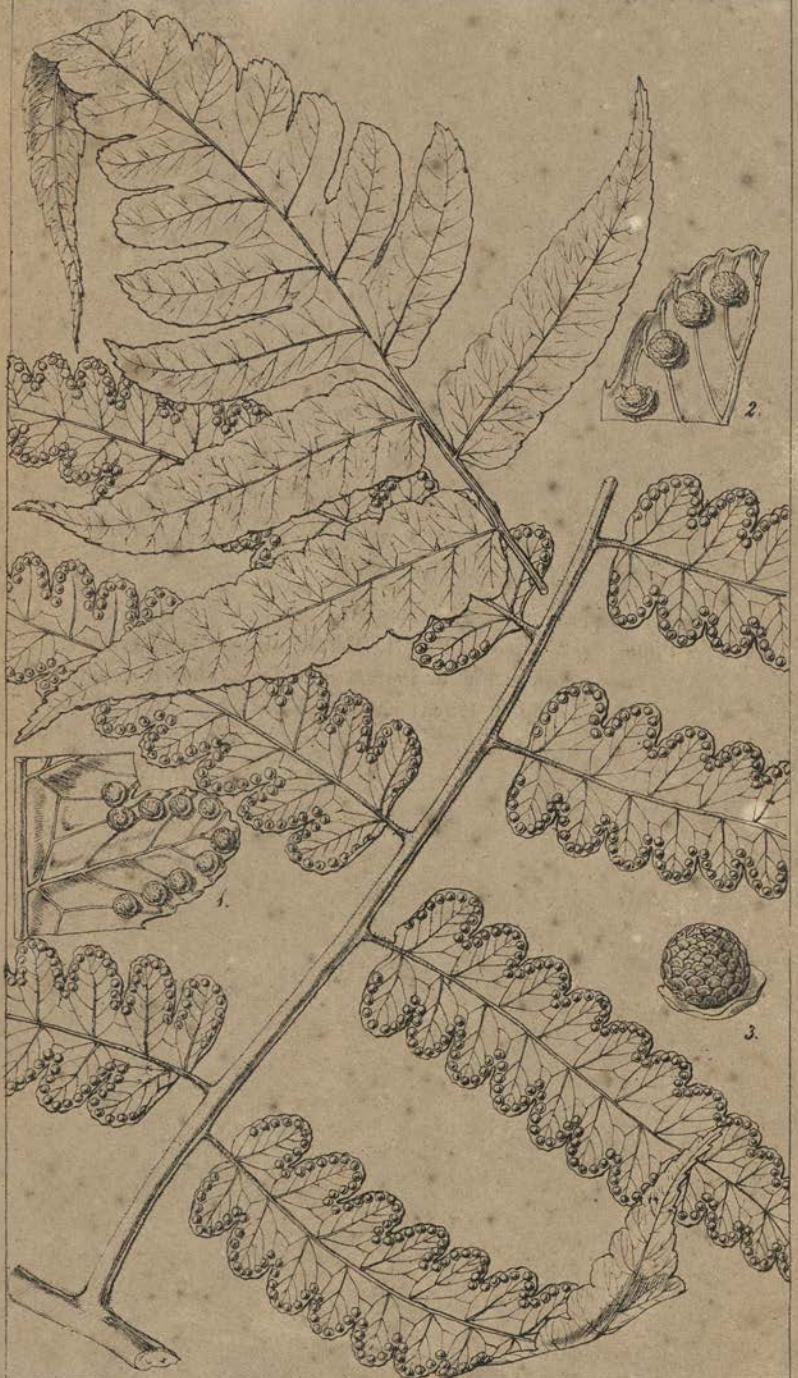
W. Fitch, lith.

Printed by H. Clark, 181 High Holborn.

Tab. XVI.

Hemitelia petiolata, *Hook.*—p. 31.

Pinna; *nat. size.* Fig. 1. Fertile segment, under side; *magnified.* Fig. 2. Portion of the same; *more magnified.* Fig. 3. Sorus; *more magnified.*



V. Fitch, lith.

Printed by W. Clark 202 High Holborn

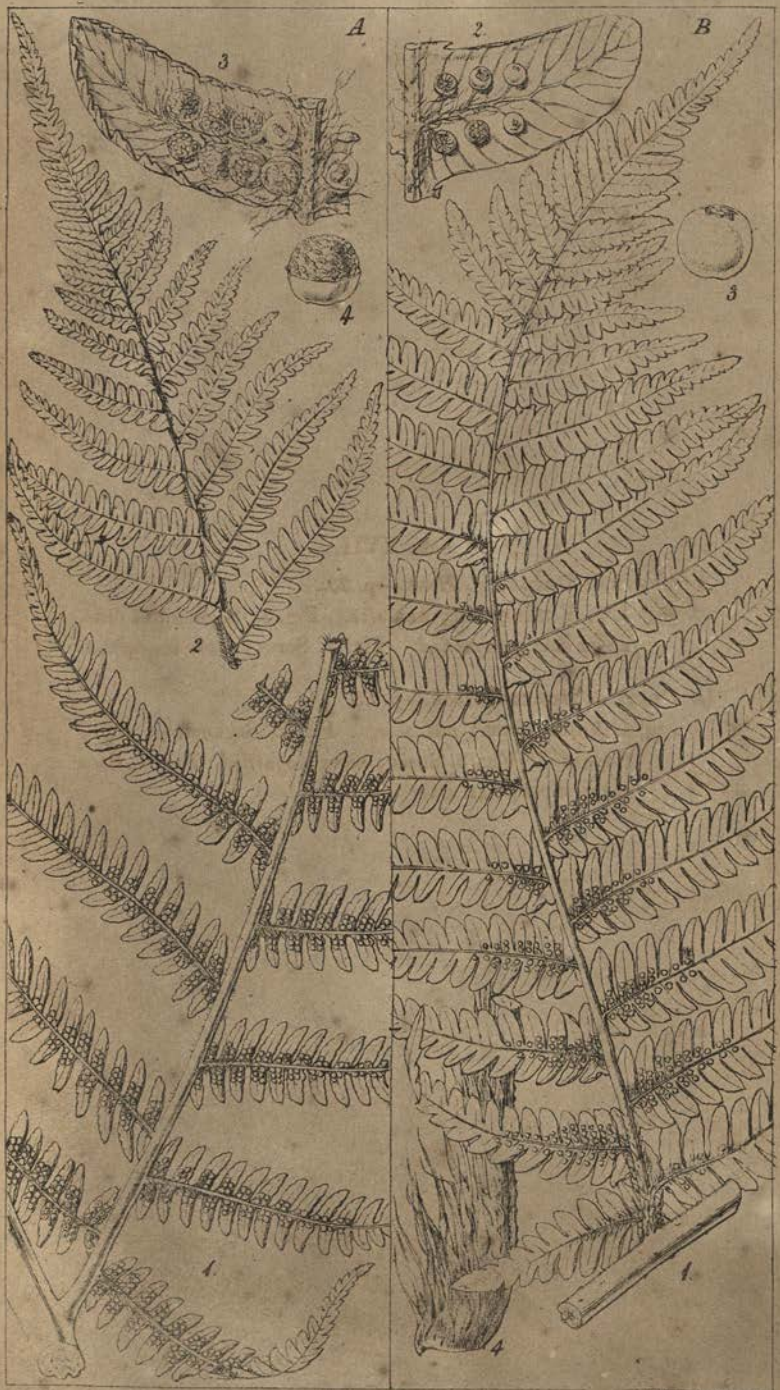
Tab. XVII.

A. Cyathea Drègei, β. *Hook.*—p. 23.

Fig. 1, 2. Fertile pinna; *nat. size.* Fig. 3. Segment of ditto, under side; *magnified.* Fig. 4. Sorus; *more magnified.*

B. Cyathea Burkei, *Hook.*—p. 23.

Fig, 1. Fertile pinna; *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Sorus; *more magnified.* Fig. 4. Base of the stipes; *nat. size.*



W. F. lith.

W. Clark, Dixon, 20, Ed. Dr.

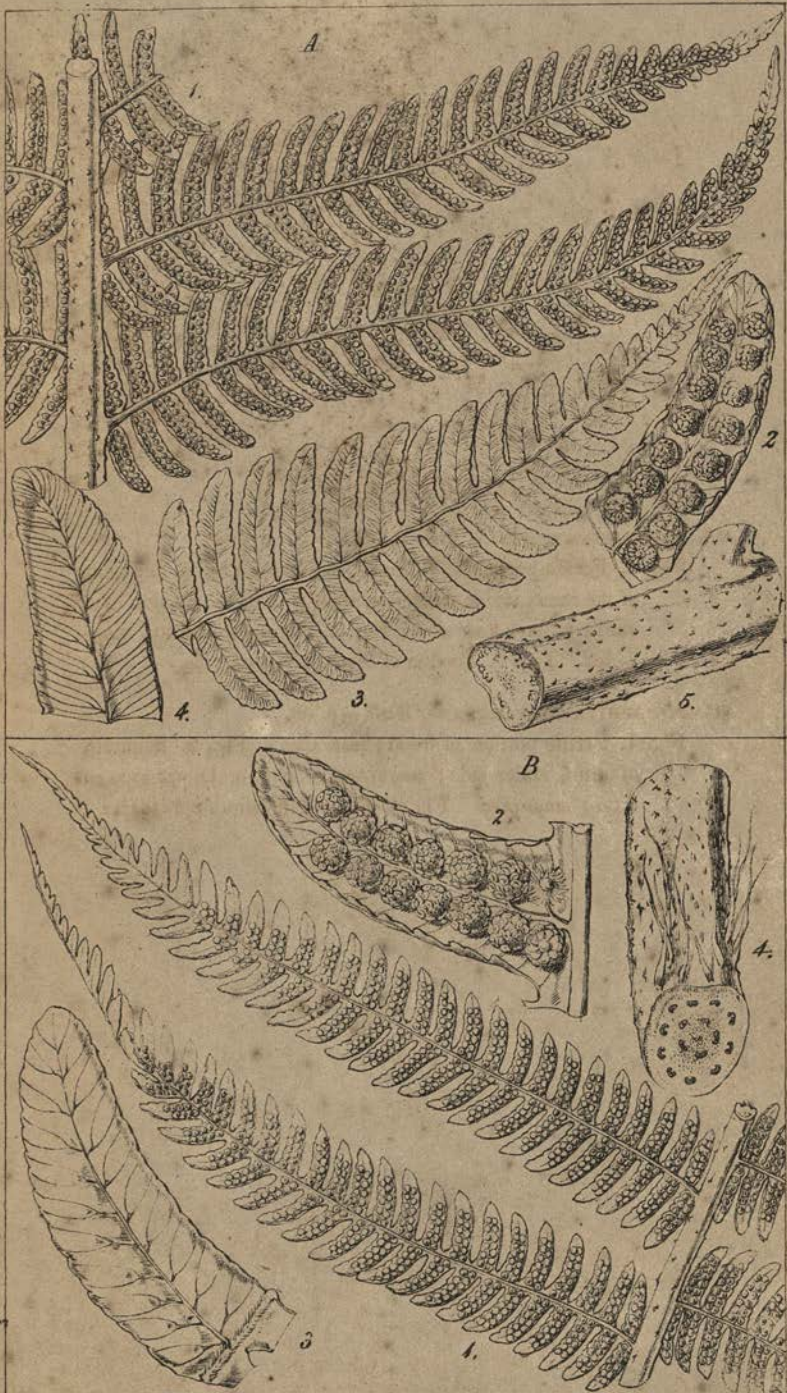
Tab. XVIII.

A. Alsophila excelsa, *Br.*—p. 49.

Fig. 1, Fertile portion of a frond; *nat. size.* Fig. 2. Segment of the same, under side; *magnified.* Fig. 3. Portion of a sterile pinna; *nat. size.* Fig. 4. Segment of ditto; *magnified.* Fig. 5. Portion of the stipes; *nat. size.*

B. Alsophila contaminans, *Wall.*—p. 52.

Fig. 1. Fertile portion of frond; *nat. size.* Fig. 2. Segment of ditto, under side; *magnified.* Fig. 3. Upper side of ditto; *magnified.* Fig. 4. Base of the stipes; *nat. size.*



W. Fitch lith

W. Clark Painter 202 High Holborn.

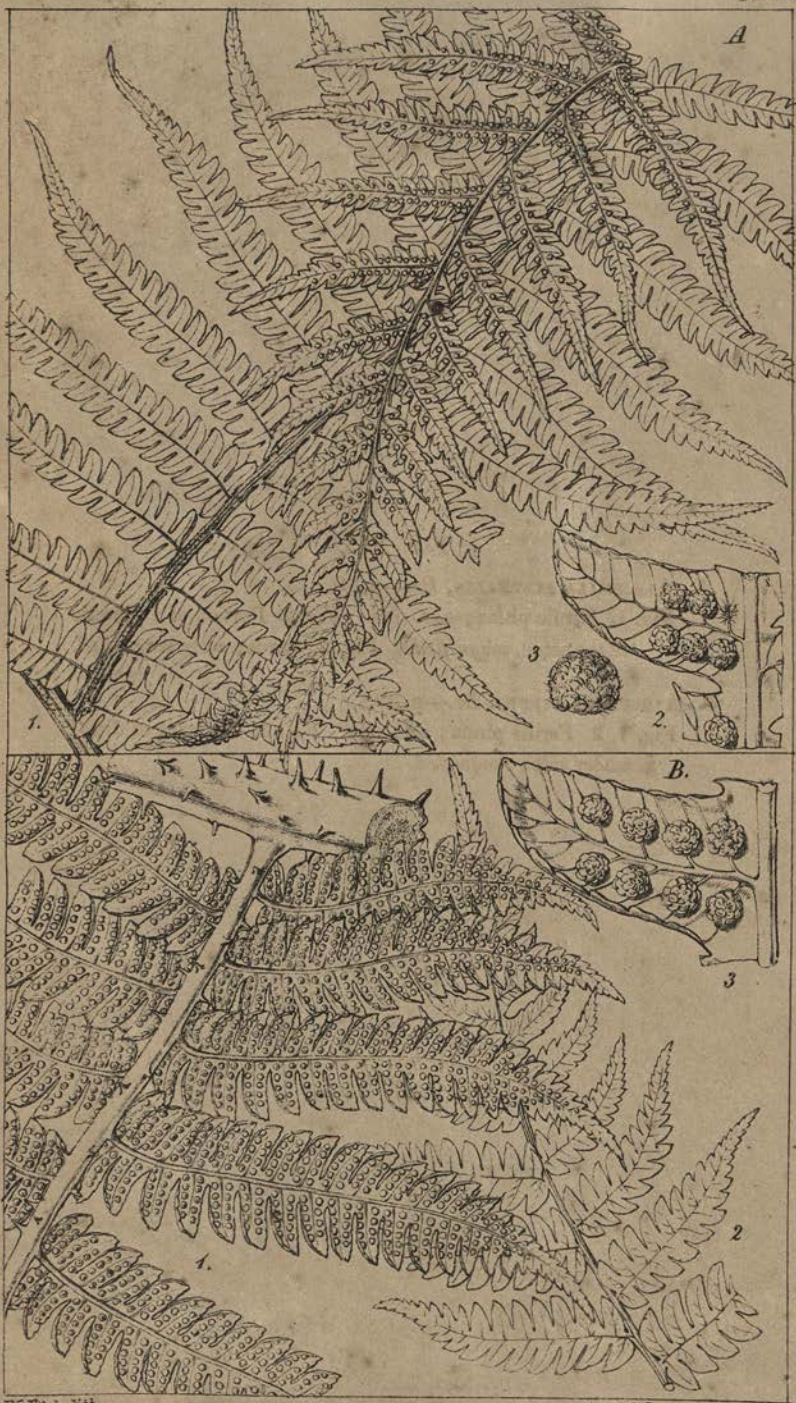
Tab. XIX.

A. Alsophila australis, *Br.*—p. 50.

Fig. 1. Fertile pinna; *nat. size.* Fig. 2. Portion of a pinnule of the same, *magnified.* Fig. 3. Sorus; *more magnified.*

B. Alsophila aspera, *Br.*—p. 39.

Fig. 1, 2. Fertile pinna; *nat. size.* Fig. 3. Segment of ditto, under side; *magnified.*



W. Fitch, lith.

W. Clerk Printer 102 High Holborn

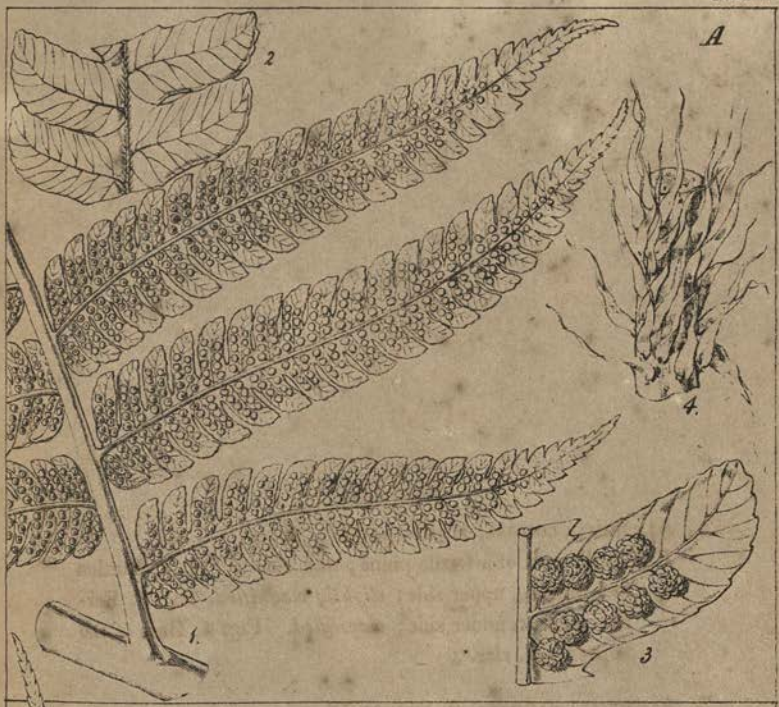
Tab. XX.

A. Alsophila comosa, *Wall.*—p. 53.

Fig. 1. Portion of a fertile pinna; *nat. size.* Fig. 2. Portion of a pinnule, upper side; *slightly magnified.* Fig. 3. Fertile segment, under side; *magnified.* Fig. 4. Base of the stipes; *nat. size.*

B. Alsophila caudata, *J. Sm.*—p. 52.

Fig. 1, 2. Portions of a fertile pinna; *nat. size.* Fig. 3. Portion of a pinnule of the same, upper side; *magnified.* Fig. 4. Segment of the same, under side; *more magnified.*



W. Fitch. Lith.
W. Clark Printer, 262, High Holborn

Tab. XXI.

A. Woodsia Guatemalensis, *Hook.*—p. 60.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Segment of a pinna; *magnified.* Fig. 3, 4. Sori; *more magnified.*

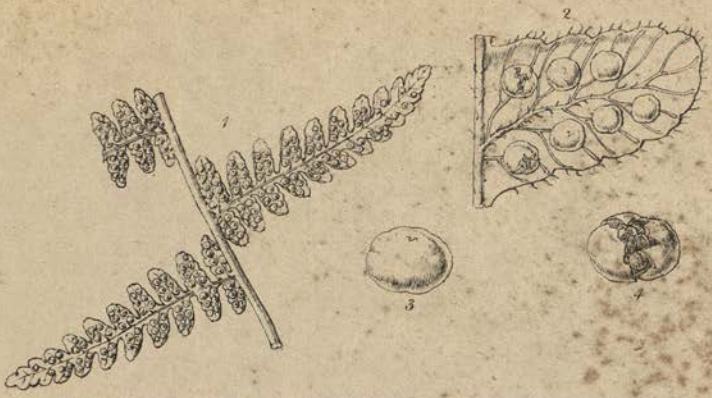
B. Woodsia Peruviana, *Hook.*—p. 61.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinnule; *magnified.* Fig. 3. Portion of the same with two sori; *more magnified.*

C. Woodsia elongata, *Hook.*—p. 62.

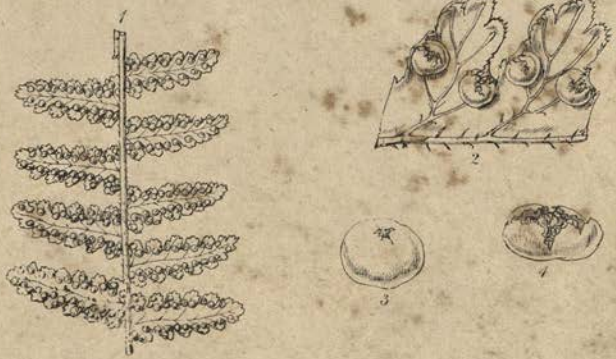
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Portion of a pinna; *magnified.* Fig. 3, 4. Sori; *more magnified.*

A



B

C



Tab. XXII.

A. Dicksonia arborescens, *L'Herit.*—p. 66.

Fig. 1. Much reduced sketch of the entire plant. Fig. 2. Pinna; *nat. size.* Fig. 3. Pinnule, seen from the upper side, with sori; *magnified.* Fig. 4. Sorus; *more magnified.*

B. Dicksonia Sellowiana, *Hook.*—p. 67.

Fig. 1. Two pinnules, sterile; *nat. size.* Fig. 2. Segment from the same; *magnified.* Fig. 3. Fertile pinna; *nat. size.* Fig. 4. Segment from the same, with sori; *magnified.* Fig. 5. Portion of the stipes; *nat. size.*

Fitch del.

prel. lith. Linn. imp.

Tab. XXIII.

A. Dicksonia Berteroana, *Hook.*—p. 67.

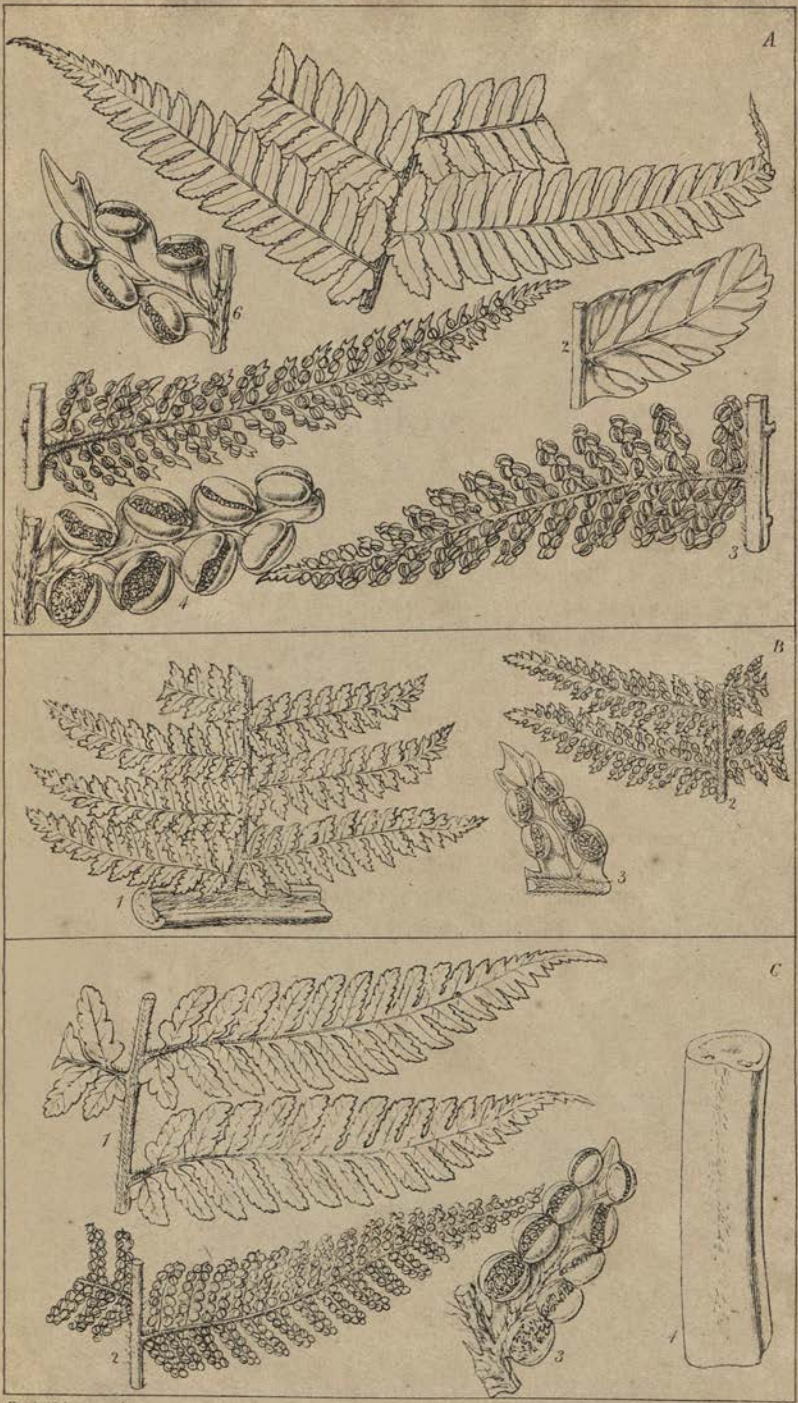
Fig. 1. Small portion of a sterile frond; *nat. size.* Fig. 2. Pinnule; *magnified.* Fig. 3. Fertile pinna; *nat. size.* Fig. 4. Pinnule of the same; *magnified.* Fig. 5. Fertile pinna, slight variety; *nat. size.* Fig. 6. Pinnule of the same; *magnified.*

B. Dicksonia fibrosa, *Colenso.*—p. 68.

Fig. 1. Small portion of a sterile frond; *nat. size.* Fig. 2. Small portion of fertile ditto; *ditto.* Fig. 3. Pinnule from the same; *magnified.*

C. Dicksonia lanata, *Colenso.*—p. 69.

Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Portion of fertile ditto; *ditto.* Fig. 3. Pinnule of the fertile frond; *magnified.* Fig. 4. Portion of the stipes; *nat. size.*


A
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4
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C
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Tab. XXIV.

A. Dicksonia coniifolia, *Hook.*—p. 70.

Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Portion of fertile ditto; *ditto.* Fig. 3. Pinnule; *magnified.* Fig. 4. Two sori; *more magnified.*

B. Dicksonia Martiana, *Klotzsch.*—p. 70.

Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Portion of fertile ditto; *ditto.* Fig. 3. Two segments with sori; *magnified.*

C. Dicksonia dubia, *Gaud.*—p. 71.

Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Fertile pinna; *ditto.* Fig. 3. Upper; and fig. 4, under side of fertile segments; *magnified.* Fig. 5. Sorus; several of the capsules having been removed; *more magnified.*

A
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B
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C
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5

Tab. XXV.

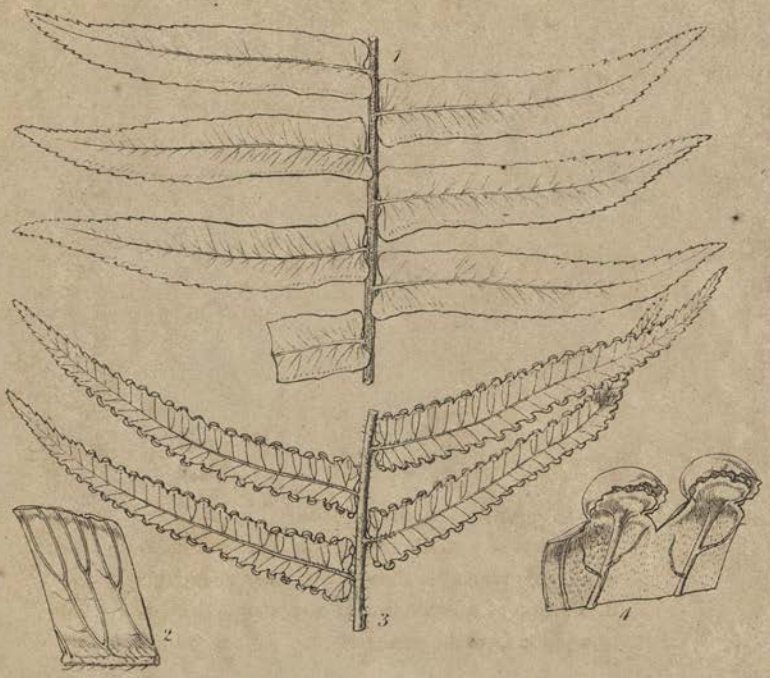
A. Dicksonia sorbifolia, *Sm.*—p. 72.

Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Portion of a sterile pinna, to show the venation; *magnified.* Fig. 3. Portion of a fertile frond; *nat. size.* Fig. 4. Portion of a pinna from the same with two sori; *magnified.*

B. Dicksonia Lindeni, *Hook.*—p. 72.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Portions of pinnæ with sori; *magnified.*

A



B

Fitch del. prel. lith. Binn. imp.

Tab. XXVI.

A. Dicksonia Pavoni, *Hook.*—p. 74.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2, 3. Portions of segments with sori; *more or less magnified.*

B. Dicksonia adiantoides, *H.B.K.*—p. 75.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2, 3. Portions of segments, with sori; *more or less magnified.*

C. Dicksonia apiifolia, *Sw.*—p. 77.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Pinnule of ditto; *magnified.* Fig. 3. Segment with sorus; *more magnified.*

Pitch del. prel. lith. Linn. imp.

Tab. XXVII.

A. Dicksonia rubiginosa, *Kaulf.*—p. 79.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Portion of the same; *more magnified.*

B. Dicksonia anthriscifolia, *Kaulf.*—p. 79.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2, 3. Segment and portion of ditto; *more and less magnified.*

C. Dicksonia appendiculata, *Wall.*—p. 79.

Fig. 1. Portion of a sterile frond; *nat. size.* Fig. 2. Portion of a fertile ditto; *ditto.* Fig. 3. Pinna from the same; *magnified.* Fig. 4. Sorus; *more magnified.*

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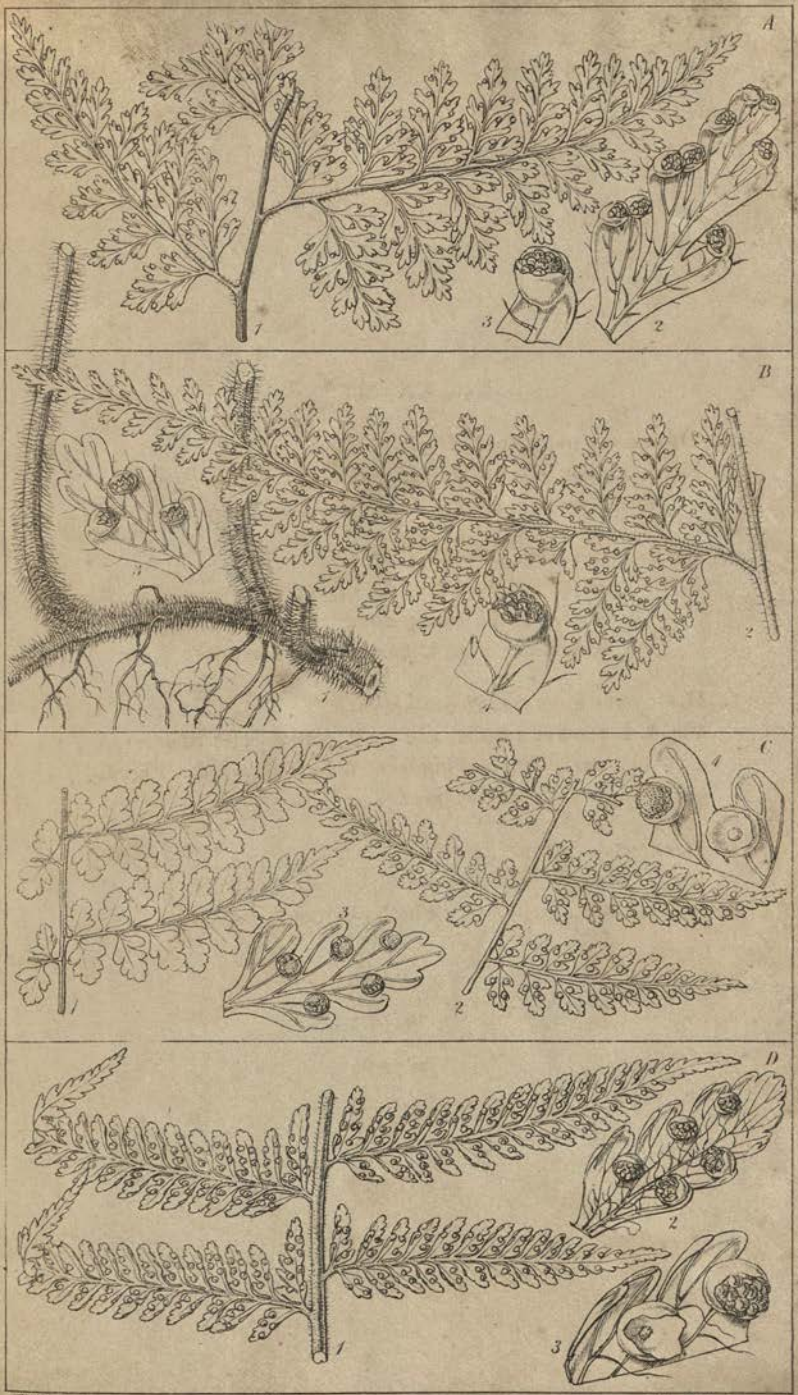
Tab. XXVIII.

A. Dicksonia deltoidea, *Hook.* p. 80.
Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Segment of ditto; *magnified.* Fig. 3. Single sorus; *more magnified.*

B. Dicksonia scabra, *Wall.*—p. 80.
Fig. 1. Caudex and portion of the stipes; *nat. size.* Fig. 2. Portion of a fertile frond; *ditto.* Fig. 3. Segment of ditto; *magnified.* Fig. 4. Sorus; *more magnified.*

C. Dicksonia cuneata, *Hook.*—p. 80.
Fig. 1. Portion of a sterile; and fig. 2, portion of a fertile frond; *nat. size.* Fig. 3. Pinnule of ditto; *magnified.* Fig. 4. Two sori; *more magnified.*

D. Dicksonia Smithii, *Hook.*—p. 80.
Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Pinnule of ditto; *magnified.* Fig. 3. Two sori; *more magnified.*



Pitch. del.

prel. lith. Linn. imp.

Tab. XXIX.

A. Cibotium glaucum, *Hook. et Arn.*—p. 82.

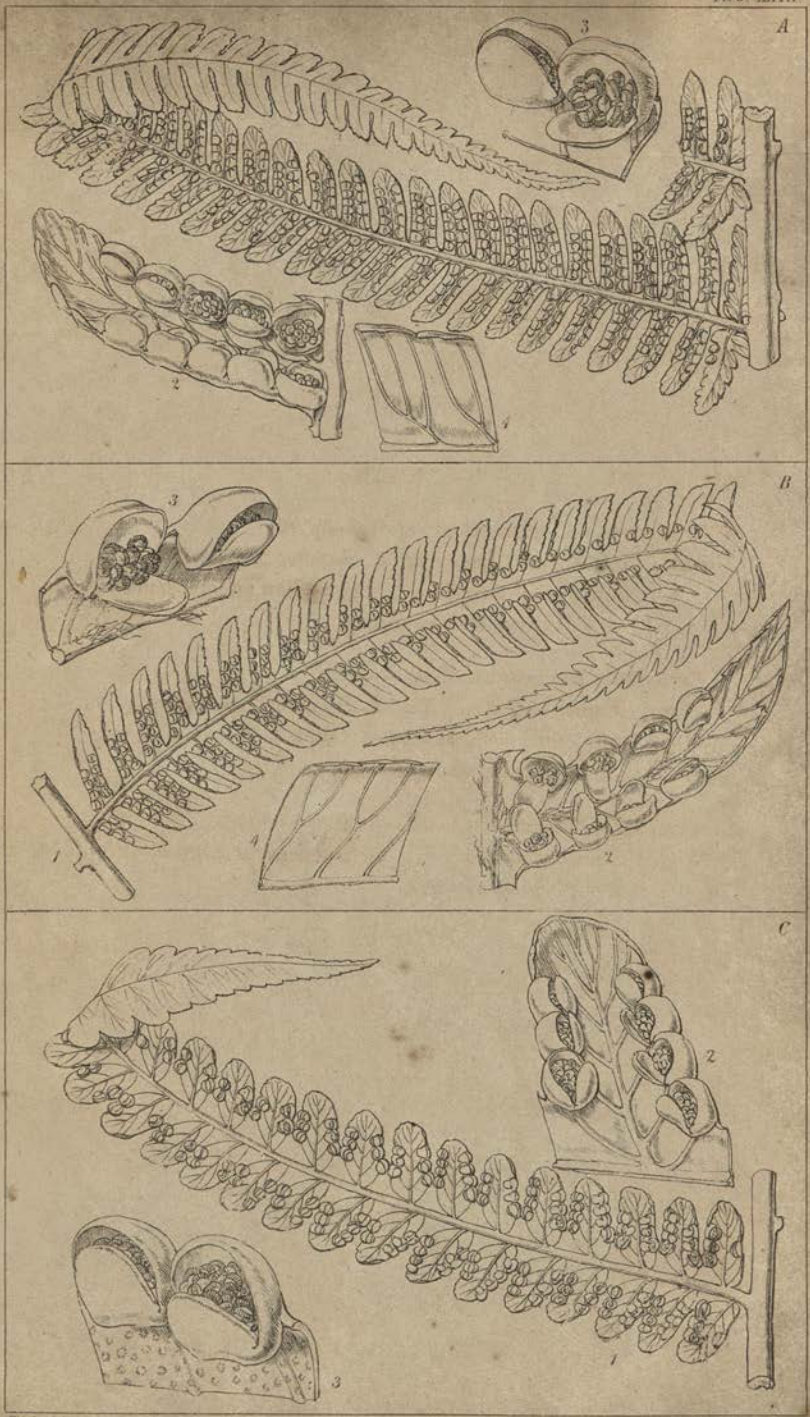
Fig. 1. Pinna; *nat. size.* Fig. 2. Segment; *magnified.* Fig. 3. Sori; *more magnified.* Fig. 4. Portion of a segment, to show the venation; *magnified.*

B. Cibotium Assamicum, *Hook.*—p. 83.

Fig. 1. Pinna; *nat. size.* Fig. 2. Segment; *much magnified.* Fig. 3. Sori; *more magnified.* Fig. 4. Portion of a segment, to show the venation; *magnified.*

C. Cibotium Menziesii, *Hook.*—p. 84.

Fig. 1. Pinna; *nat. size.* Fig. 2. Segment; *magnified.* Fig. 3. Sori; *more magnified.*



Pitch del.

prel. lith. Linn. imp.

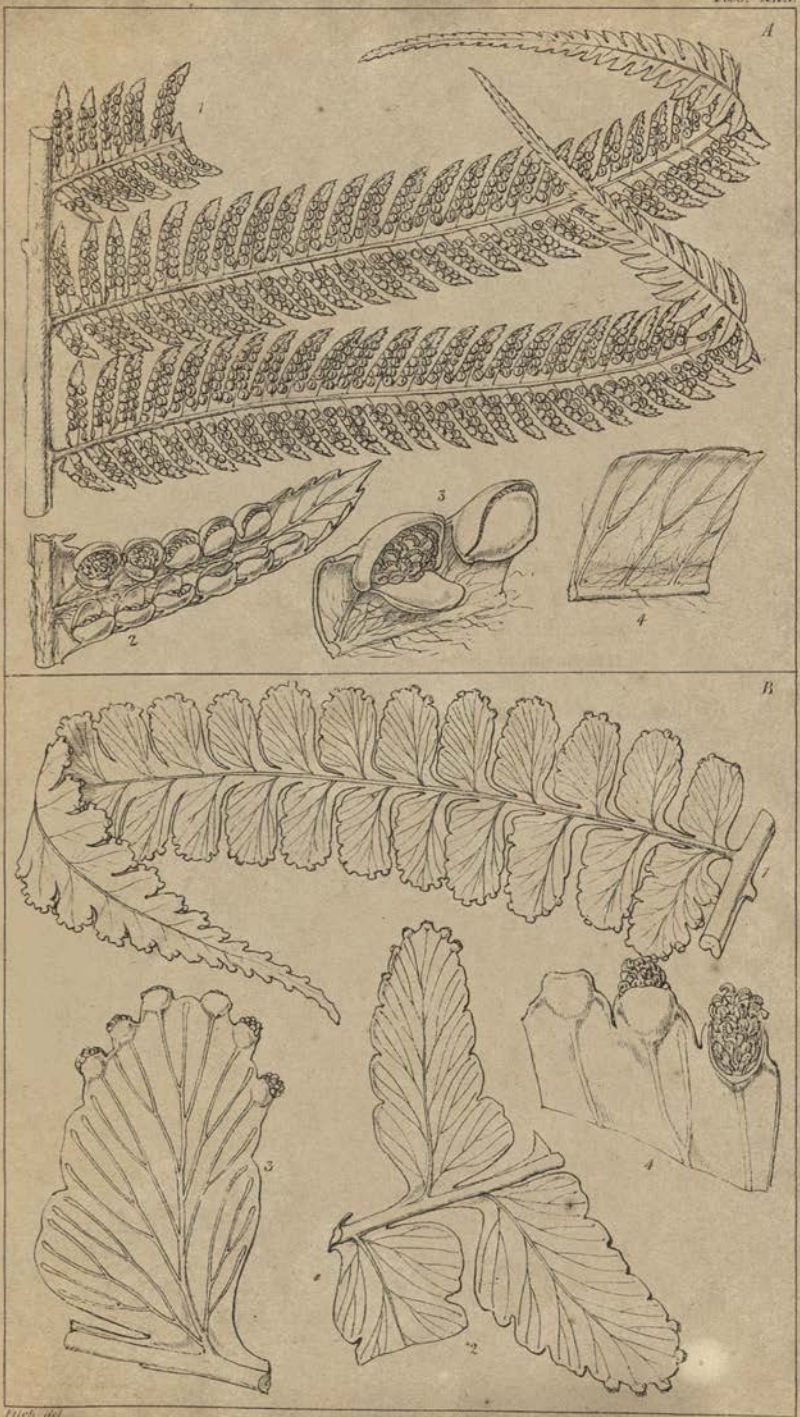
Tab. XXX.

A. Cibotium Schiedei, *Schlecht. & Cham.*—p. 84.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Segment; *magnified.* Fig. 3. Sori; *more magnified.* Fig. 4. Portion of a segment, to show the venation.

B. Deparia Mathewsii, *Hook.*—p. 85.

Fig. 1. Pinna; *nat. size.* Fig. 2. Portion of a larger pinna; *ditto.* Fig. 3. Segment or pinnule; *magnified.* Fig. 4. Sori; *more magnified.*



Fitch del.

prof. lith. Lubl. imp.

Tab. XXXI.

A. Hymenophyllum cruentum, *Cav.*—p. 87.
Fig. 1. Plant; *nat. size.* Fig. 2. Sori; *magnified.*

B. Hymenophyllum abruptum, *Hook.*—p. 88.
Fig. 1. Plant; *nat. size.* Fig. 2. Sorus; *magnified.*

C. Hymenophyllum Boryanum, *Willd.*—p. 89.
Fig. 1. Plant; *nat. size.* Fig. 2. Sorus; *magnified.*

D. Hymenophyllum hirtellum, *Sw.*—p. 90.
Fig. 1. Plant; *nat. size.* Fig. 2. Sorus; *magnified.*

Fitch del.

prel. lith. Linn imp.

Tab. XXXII.

A. Hymenophyllum Chiloense, *Hook.*—p. 90.
Fig. 1. Plant; *nat. size.* Fig. 2. Segment of a frond; *magnified.*

B. Hymenophyllum Organense, *Hook.*—p. 90.
Fig. 1. Lower portion of a plant; *nat. size.* Fig. 2. Segments with sori; *magnified.*

Fitch. del.

prel. lith. Linn. imp.

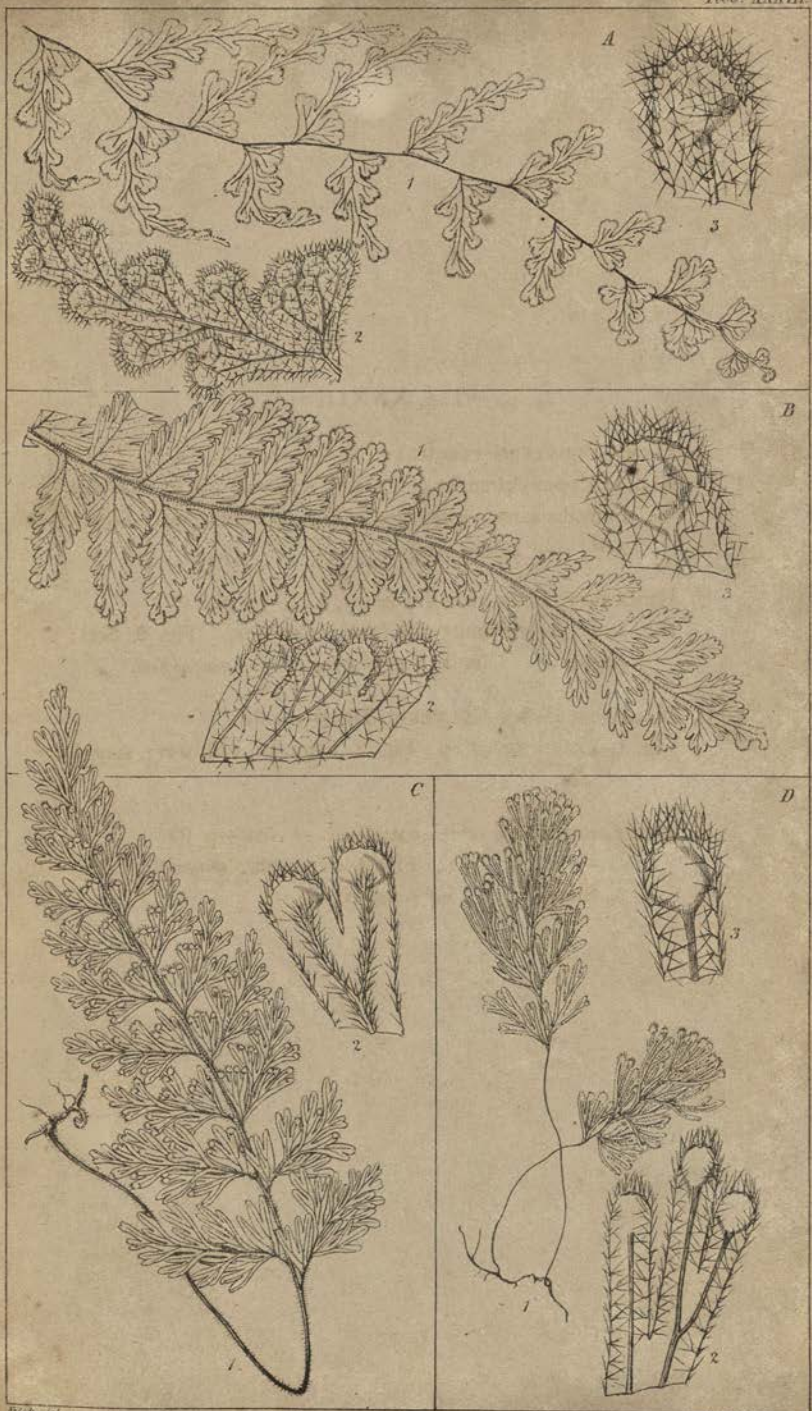
Tab. XXXIII.

A. Hymenophyllum pulchellum, *Schlecht.*—p. 91.
Fig. 1. Upper extremity of a frond; *nat. size.* Fig. 2. Pinna from the same; *magnified.* Fig. 3. Sorus; *more magnified.*

B. Hymenophyllum interruptum, *Kze.*—p. 92.
Fig. 1. Upper extremity of a frond; *nat. size.* Fig. 2. Sori; *magnified.* Fig. 3. Single sorus; *more magnified.*

C. Hymenophyllum Berteroi, *Hook.*—p. 93.
Fig. 1. Plant; *nat. size.* Fig. 2. Segment, with sori; *magnified.*

D. Hymenophyllum obtusum, *Hook. et Arn.*—p. 93.
Fig. 1. Plant; *nat. size.* Fig. 2. Segments; *magnified.* Fig. 3. Single sorus; *more magnified.*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Tab. XXXIV.

A. Hymenophyllum æruginosum, *Carm.*—p. 94.
Fig. 1. Plant; *nat. size.* Fig. 2. Segment of the frond, with two sori; *magnified.*

B. Hymenophyllum lanceolatum, *Hook. et Arn.*—p. 94.
Fig. 1. Plant; *nat. size.* Fig. 2. Apex of a segment, with sorus; *magnified.*

C. Hymenophyllum Lindeni, *Hook.*—p. 94.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Segments with sori; *magnified.*

D. Hymenophyllum pectinatum, *Cav.*—p. 96.
Fig. 1. Plant; *nat. size.* Fig. 2. Sterile apex of a frond; *magnified.* Fig. 3. Sori; *magnified.*

Fitch. del.
prel. lith. Linn. imp.

Tab. XXXV.

A. Hymenophyllum Jamesoni, *Hook.*—p. 96.
Fig. 1. Upper half of a frond; *nat. size.* Fig. 2. Pinna, with the crested rachis; *magnified.* Fig. 3. Sorus; *magnified.*

B. Hymenophyllum Smithii.—p. 97.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Segments of ditto, with a sorus; *magnified.*

C. Hymenophyllum Bridgesii, *Hook.*—p. 97.
Fig. 1. Sterile pinnæ, and fig. 2. fertile pinnæ of a frond; *nat. size.* Fig. 3. Pinnule with sori; *magnified.*

D. Hymenophyllum bivalve, *Swartz.*—p. 98.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

A
1
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B
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C
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1
3
D
3
2
1

Tab. XXXVI.

A. Hymenophyllum dichotomum, *Cav.*—p. 98.
Fig. 1. Stipes; and fig. 2. Portion of a frond; *nat. size.* Fig. 3. Portion of the rachis; *magnified.* Fig. 4. Segments with a sorus; *magnified.*

B. Hymenophyllum attenuatum, *Hook.*—p. 99.
Fig. 1. Stipes; and fig. 2. Portion of a frond; *nat. size.* Fig. 3. Segment with sori; *magnified.*

C. Hymenophyllum fimbriatum, *J. Sm.*—p. 102.
Fig. 1. Lower part of a frond and stipes; and fig. 2. Extremity of a frond; *nat. size.* Fig. 3. Segments with sori; *magnified.*

D. Hymenophyllum fuciforme, *Sw.*—p. 103.
Fig. 1. Stipes; and figs. 2, 3. Portions of the frond; *nat. size.* Fig. 4. Segment with sori; *magnified.*

Pitch del.

prel. lith. Linn. imp.

Tab. XXXVII.

A. Hymenophyllum pulcherrimum, *Col.*—p. 103.
Fig. 1. Stipes; and fig. 2. Portion of the frond; *nat. size.* Fig. 3. Segment of a frond; *magnified.*

B. Hymenophyllum protrusum, *Hook.*—p. 104.
Fig. 1. Stipes and base of a frond; and fig. 2. Apex of a frond; *nat. size.* Fig. 3. Segments with sori; *magnified.*

C. Hymenophyllum recurvum, *Hook.*—p. 104.
Fig. 1. Stipes and base of a frond; and fig. 2. Extremity of a frond; *nat. size.* Fig. 3. Segment with sorus; *magnified.*

D. Hymenophyllum myriocarpum, *Hook.*—p. 106.
Fig. 1. Stipes and base of a frond; and fig. 2. Apex of a frond; *nat. size.*

A
C
B
D
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Tab. XXXVIII.

A. Hymenophyllum exsertum, *Wall.*—p. 109.
Fig. 1. Plant; *nat. size.* Fig. 2. Pinna; *magnified.* Fig. 3. Sorus; *more magnified.*

B. Hymenophyllum capillaceum, *Roxb.*—p. 109.
Fig. 1. Plant; *nat. size.* Fig. 2. Pinna; *magnified.* Fig. 3. Sorus; *more magnified.*

C. Hymenophyllum reniforme, *Hook.*—p. 110.
Fig. 1. Plant; *nat. size.* Fig. 2. Pinna with sori; *magnified.* Fig. 3. Single sorus; *more magnified.*

A
3
2
1

B
1
3
2

C
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1
3

Tab. XXXIX.

A. Trichomanes parvulum, *Poir.*—p. 118.
Fig. 1. Plant; *nat. size.* Fig. 2. Portion of the same; *magnified.* Fig. 3. Sori; *ditto.*

B. Trichomanes proliferum, *Bl.*—p. 118.
Fig. 1. Plant; *nat. size.* Fig. 2. Frond; *magnified.* Fig. 3. Sori; *ditto.*

C. Trichomanes attenuatum, *Hook.*—p. 122.
Fig. 1. Stipites; and fig. 2. Upper portion of a frond; *nat. size.* Fig. 3. Sori and portion of a segment; *magnified.*

D. Trichomanes Kunzeanum, *Hook.*—p. 127.
Fig. 1. Pinna; *nat. size.* Fig. 2. Segment, with sori; *magnified.* Fig. 3. Single sorus; *more magnified*

A

B

C

Fitch. del. prel. lith. Linn. imp.

Tab. XL.

A. Trichomanes glauco-fuscum, *Hook.*—p. 128.
Fig. 1. Plant; *nat. size.* Fig. 2. Fertile portion of a segment; *magnified.* Fig. 3. Sorus; *more magnified.*

B. Trichomanes cæspitosum, *Hook.*—p. 132.
Fig. 1, 12. Plant with terminal sori; *nat. size.* Fig. 2. Sorus; *magnified.* Fig. 3. Plant with lateral sori; *nat. size.* Fig. 4. Sorus; *magnified.*

C. Trichomanes anceps, *Hook.*—p. 135.
Fig. 1. Pinna of α.; *nat. size.* Fig, 2. Fertile portion of β.; *magnified.* Fig. 3. Pinna of β.; *nat. size.*

Fitch del.

prel. lith. Linn imp.

Tab. XLI.

A. Trichomanes lucens, *Sw.*—p. 138.

Fig. 1. Pinnæ; *nat size.* Fig. 2. Portion of a fertile pinna; *magnified.* Fig. 3. Sorus; *more magnified.*

B. Trichomanes Lambertianum, *Hook.*—p. 139.

Fig. 1. Upper portion of a frond; *nat. size.* Fig. 2. Pinna; *magnified.* Fig. 3. Fertile portion of the same; *more magnified.*

C. Davallia vestita, *Bl.*—p. 156.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Fertile portion of the same; *magnified.* Fig. 3. Sorus; *more magnified.*

A
1
2
3
B
3
2
C
1
2

Tab. XLII.

A. Davallia parallela, *Wall.*—p. 153.
Fig. 1, 2. Sterile and fertile plants; *nat. size.* Fig. 3. Portion of a fertile segment; *magnified.*

B. Davallia solida, *Sw. var.* β. latifolia, *Hook.*—p. 163.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Fertile segment; *magnified.*

Fitch del

pr el. lith. Linn imp.

Tab. XLIII.

A. Davallia elegans, *Sw. var. a.* bidentata, *Hook.*—p. 165.
Fig. 1. Portion of a plant; *nat. size.* Fig. 2. Fertile pinna; *nat. size.* Fig. 3. Sorus; *more magnified.*

B. Davallia elegans, *Sw. var. δ.* coniifolia, *Hook.*—p. 165.
Fig. 1. Portion of a plant; *nat. size.* Fig. 2. Fertile pinna; *magnified.* Fig. 3, Fertile pinna; *more magnified.*

Fitch del.

pre. lith. Launing

Tab. XLIV.

A. Davallia nitidula, *Kze.*—p. 165.
Fig. 1. Portion of a plant; *nat. size.* Fig. 2. Fertile pinna; *magnified.* Fig. 3. Sorus; *magnified.*

B. Davallia decurrens, *Hook.*—p. 167.
Fig. 1. Portion of a plant; *nat. size.* Fig. 2. Fertile pinna; *magnified.* Fig. 3. Sorus; *magnified.*

A
1
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3
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Tab. XLV.

A. Davallia pedata, *Sw.*—p. 154.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Sori; *magnified.* Fig. 3. Sterile plant; *nat. size.*

B. Davallia Cumingii, *Hook.*—p. 155.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Segment with sori; *magnified.* Fig. 3. Sterile frond; *nat. size.*

A
B
2
2
3
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1

Tab. XLVI.

A. Davallia triphylla, *Hook.*—p. 162.
Fig. 1. Fertile frond; *nat. size.* Fig. 2. Sori; *nat. size.*

B. Davallia lonchitidea, *Wall.*—p. 173.
Fig. 1. Pinna; *nat. size.* Fig. 2. Segment with sori; *magnified.* Fig. 3. Sorus, with the involucre forced back; *more magnified.*

Fitch del.

pr. el. lith. Linn. imp.

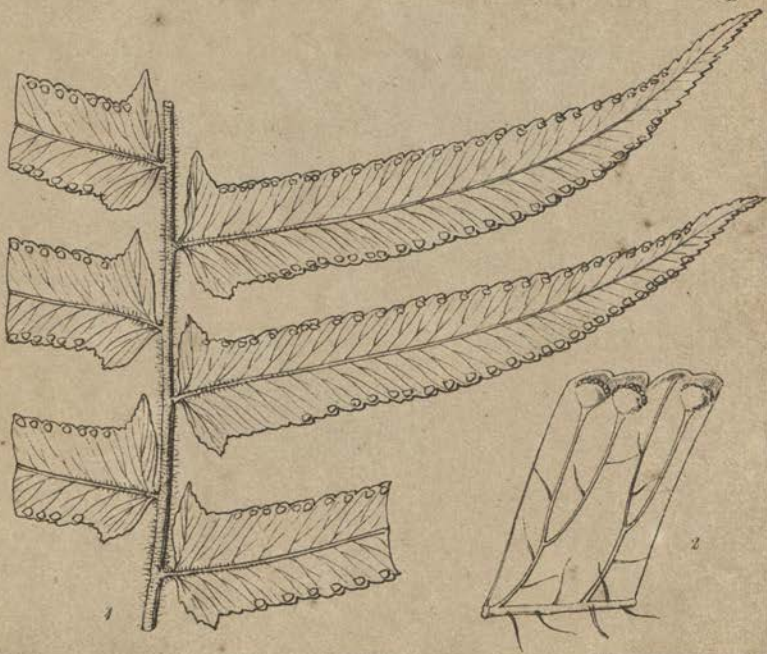
Tab. XLVII.

A. Davallia Khasiyana, *Hook.*—p. 173.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Segment with sori; *magnified.*

B. Davallia Hookeriana, *Wall.*—p. 172.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Sori; *magnified.*

A

B



Tab. XLVIII.

A. Davallia villosa, *Wall.*—p. 172.

Fig. 1. Pinna, and fig. 2, apex of a frond; *nat. size.* Fig. 3. Segment with sori; *magnified.* Fig. 4. Sorus; *more magnified.*

B. Davallia calvescens, *Wall.*—p. 172.

Fig. 1. Pinna; *nat. size.* Fig. 2. Segment, with sori; *magnified.*

Fitch del.

prel. lith. Linn. imp.

Tab. XLIX.

A. Davallia Imrayana, *Hook.*—p. 171.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Portion of a pinna, with sori; *magnified.*

B. Davallia Griffithiana, *Hook.*—p. 168.

Fig. 1. Stipes and caudex, and fig. 2. Portion of a frond; *nat. size.* Fig. 3. Pinnule, with sori; *more magnified.*

Fitch del et lith.

prel. lith. Lint. imp.

Tab. L.

A. Davallia Schimperi, *Hook.*—p. 193.
Fig. 1, 2, 3. Frond, (in portions); *nat. size.* Fig. 4. Sorus; *magnified.*

B. Davallia bullata, *Wall.*—p. 169.
Fig, 1, 2, 3. Portions of a frond; *nat. size.* Fig. 4. Pinna, with sori; *magnified.*

C. Davallia Goudotiana, *Kze.*—p. 189.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

A
B

Tab. LI.

A. Davallia chærophylla, *Wall.*—p. 157.

Fig. 1. Stipes and caudex; and fig. 2. Pinna; *nat. size.* Fig. 3. Pinnule, with sori; *magnified.*

B. Davallia Novæ Zelandiæ, *Col.*—p. 158.

Fig. 1. Stipes and caudex; and fig. 2. Pinnæ; *nat. size.* Fig. 3. Pinnule with sori; *magnified.*

A
3
2
1

B
3
2
1

Tab. LII.

A. Davallia retusa, *Cav.*—p. 188.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna; *magnified.* Fig. 3. Sorus; *more magnified.*

B. Davallia affinis, *Hook.*—p. 158.

Fig. 1. Stipes and caudex; and fig. 2. Pinna; *nat. size.* Fig. 3. Pinnule with sori; *magnified.*

Fitch del. et lith.

prel. lith. Linn. imp.

Tab. LIII.

A. Davallia membranulosa, *Wall.*—p. 159.

Fig. 1. Lower portion; and fig. 2. Apex of a frond; *nat. size.* Fig. 3. Segment of a fertile pinna; *magnified.* Fig. 4. Sorus; *more magnified.*

B. Davallia pulchella, *Hook.*—p. 175.

Fig. 1. Lower; and fig. 2. Middle portion of a frond; *nat. size.* Fig. 3. Pinna with sori; *magnified.*

C. Davallia Parkeri, *Hook.*—p. 176.

Fig. 1. Lower; and fig. 2. Middle portion of a frond; *nat. size.* Fig. 3. Pinna, with sori; *magnified.* Fig. 4. Sorus; *more magnified.*

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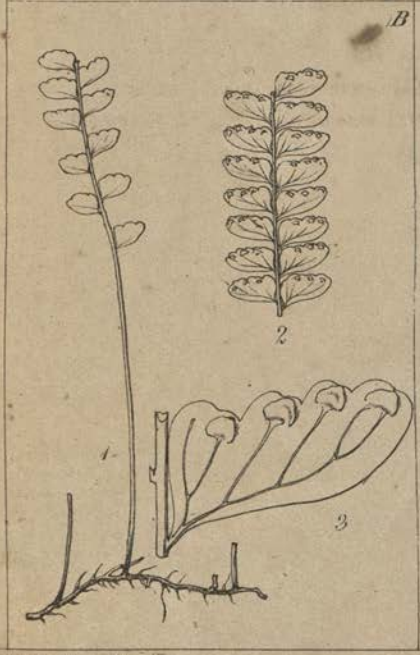
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Tab. LIV.

A. Davallia Blumeana, *Hook.*—p. 177.

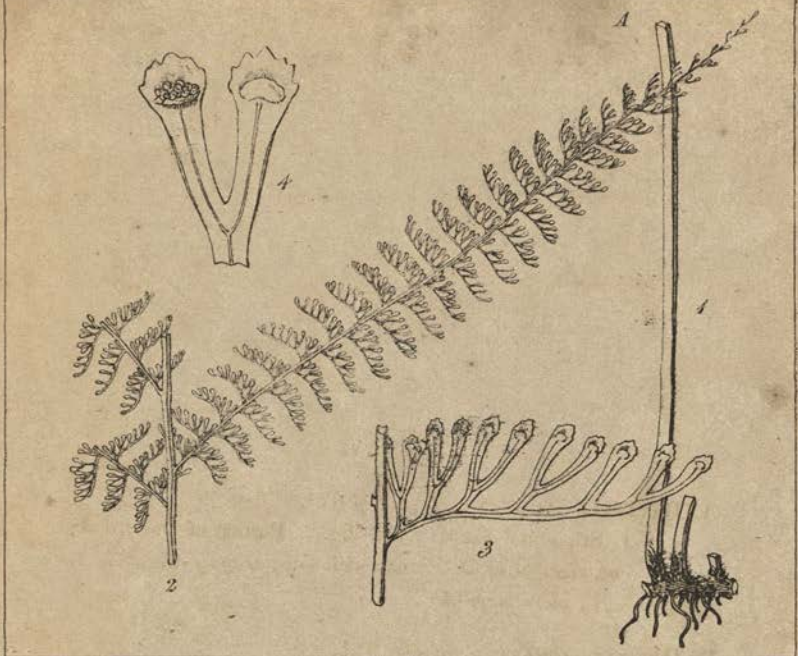
Fig. 1. Stipes and caudex; and fig. 2. Portion of the frond; *nat. size.* Fig. 3. Pinna, with sori; *magnified.* Fig. 4. Sori; *more magnified.*

B. Davallia aculeata, *Sw.*—p. 191.

Fig. 1. Portion of the frond; *nat. size.* Fig. 2. Pinna, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

C. Davallia Schlechtendalii, *Pr.*—p. 189.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*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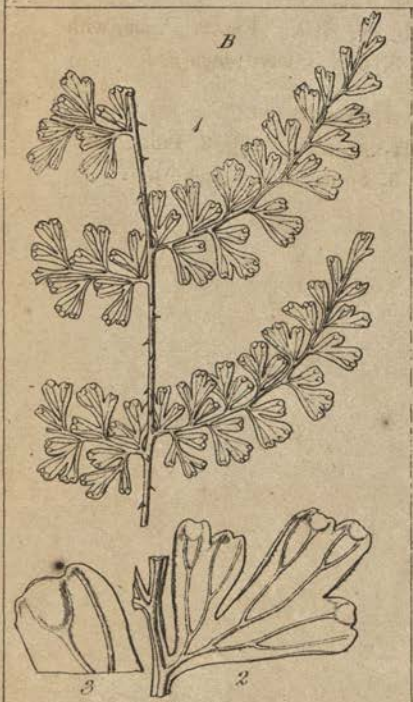
B
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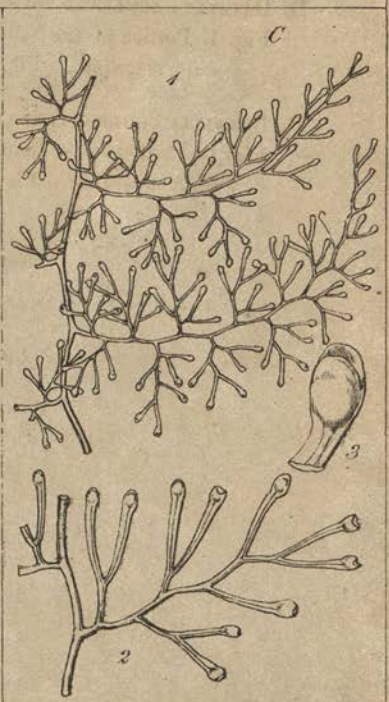
C
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Tab. LV.

A. Davallia elata, *Sw.*—p. 166.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Portion of a pinnule; *magnified.* Fig. 3 and 4. Sori; *more magnified.*

B. Davallia Mauritiana, *Hook.*—p. 164.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

C. Davallia pyxidata, *Cav.*—p. 169.

Fig. 1 Portion of the frond of *a. nat. size.* Fig. 2. Pinnule, with sori; *magnified.* Fig. 3. Portion of the frond of *var. β. nat. size.* Fig. 4. Portion of a pinnule of ditto, with sori; *magnified.*

D. Davallia Fejeensis, *Hook.*—p. 166.

Fig. 1. Apex of a frond; *nat. size.* Fig. 2. Portion of a pinna, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

A
B
C
D
1
2
3
4

Tab. LVI.

A. Davallia Canariensis.—p. 169.

Fig. 1. Portion of a Frond; *nat. size.* Fig. 2. Segment, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

B. Davallia Lindeni, *Hook.*—p. 193.

Fig. 1. Rachis and pinnæ, and fig. 2. Apex of a frond; *nat. size.* Fig. 3. Segments, with sori; *magnified.*

C. Davallia Amboynensis, *Hook.*—p. 178.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinnule, with sori; *magnified.* Fig. 3. Segment, with sori; *more magnified.*

D. Davallia? achillæifolia, *Wall.*—p. 197.

Fig. 1. Caudex and frond; *nat. size.* Fig. 2. Segments and rachis; *magnified.*

Fitch del. et lith.

prel. lith. Imp. imp.

Tab. LVII.

A. Davallia Khasiyana, *Hook.* var. β.—p. 173.
Fig. 1. Pinna; *nat. size.* Fig. 2. Pinnule, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

B. Davallia inæqualis, *Kze.*—p. 180.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinnule; *magnified.* Fig. 3. Sorus; *more magnified.* (See Tab. LVIII. A.)

A
1
2
3
B
3
1
2

Tab. LVIII.

A. Davallia inæqualis, *Kze.* var. γ. minor, *Hook.*—p. 180.
Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinna, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

B. Davallia Lindleyi, *Hook.*—p. 164.
Fig. 1. Stipes, with caudex, and fig. 2. Portion of a barren frond; *nat. size.* Fig. 3. Sterile pinnule; *magnified.* Fig. 4. Portion of a fertile frond; *nat. size.* Fig. 5. Pinna, with sori; *magnified.*

A

B

Tab. LIX.

A. Davallia polyantha, *Hook.*—p. 168.

Fig. 1. Portion of a frond; *nat. size.* Fig. 2. Pinnule, with sori; *magnified.* Fig. 3. Sorus; *more magnified.*

B. Davallia Vogelii, *Hook.*—p. 168.

Fig. 1. Caudex and stipes, and fig. 2. Portion of a frond; *nat. size.* Fig. 3. Pinnule with sori; *magnified.*

☞ The explanation of Tab. LX. will be given in Part IV.

A

B

Tab. LX.

A. Davallia ciliata, *Hook.*—p. 184.

Fig. 1. Rachis and lower portion of the stipes, *nat. size.* Fig. 2. Portion of the frond, *nat. size.* Fig. 3. Fertile segments, *magnified.* Fig. 4. Sorus, *magnified.*

B. Figs. 1 & 4, Davallia pinnata, *Cav.*—p. 174.

Fig. 1. Portion of stipes and caudex, *nat. size.* Fig. 4. Pinnæ, *nat. size.* Figs. 2, 3, & 5, Davallia Luzonica, *Hook.* —p. 174. Fig. 2. Pinnæ, *nat. size.* Fig. 3. Pinnule or segment, *magnified.* Fig. 5. Sori, *magnified.*

Fitch del et lith.

prel. lith. Linn. imp.

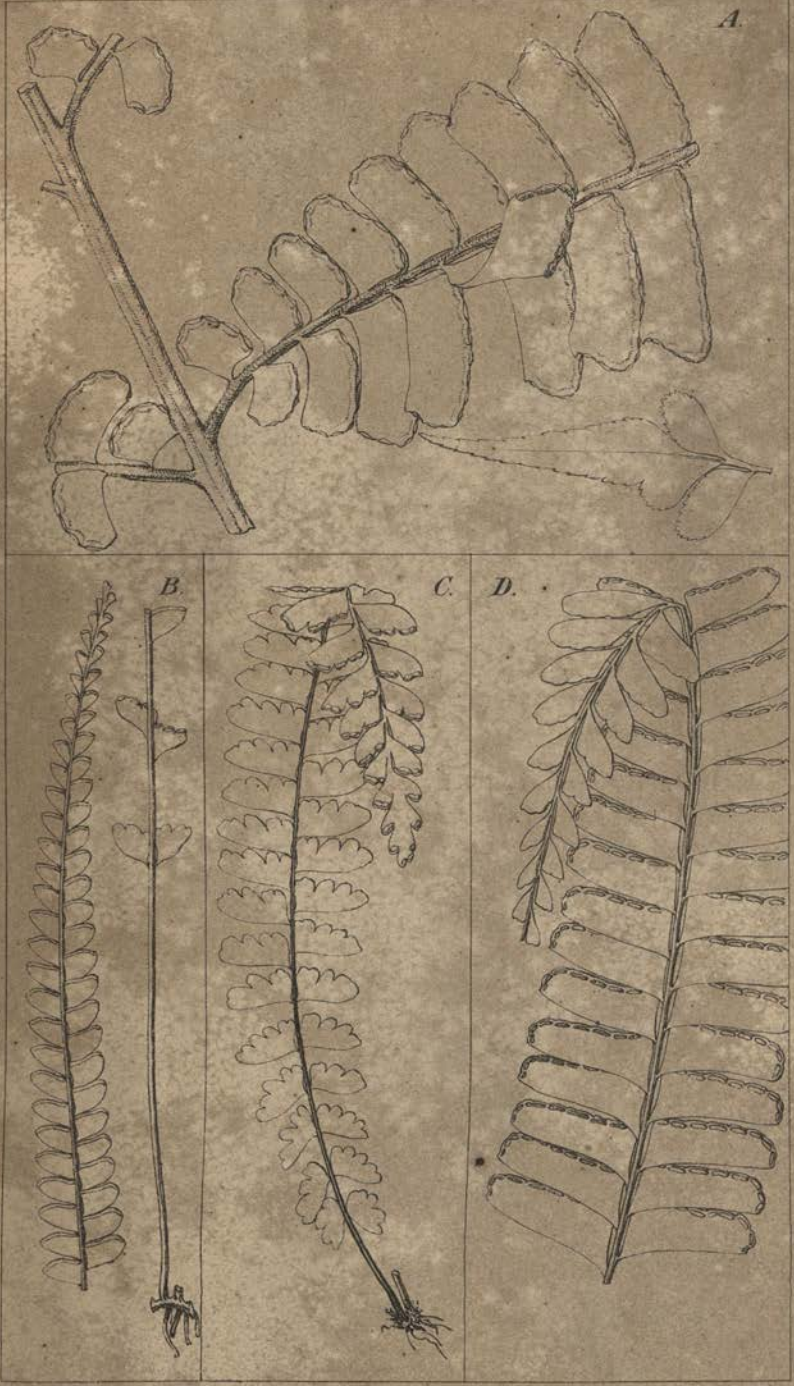
TAB. LXI.

A. ADIANTUM (*to be described in vol.* 2).

B. LINDSÆA CONCINNA, *J. Sm.*—p. 205.
Upper and lower portion of a plant, *nat. size.*

C. LINDSÆA ADIANTOIDES, *J. Sm.*—p. 204.
Plant, *nat. size.*

D. LINDSÆA OBLONGIFOLIA, *Reinw.*—p. 206.
Upper portion of a plant, *nat. size.*


A.
B.
C.
D.

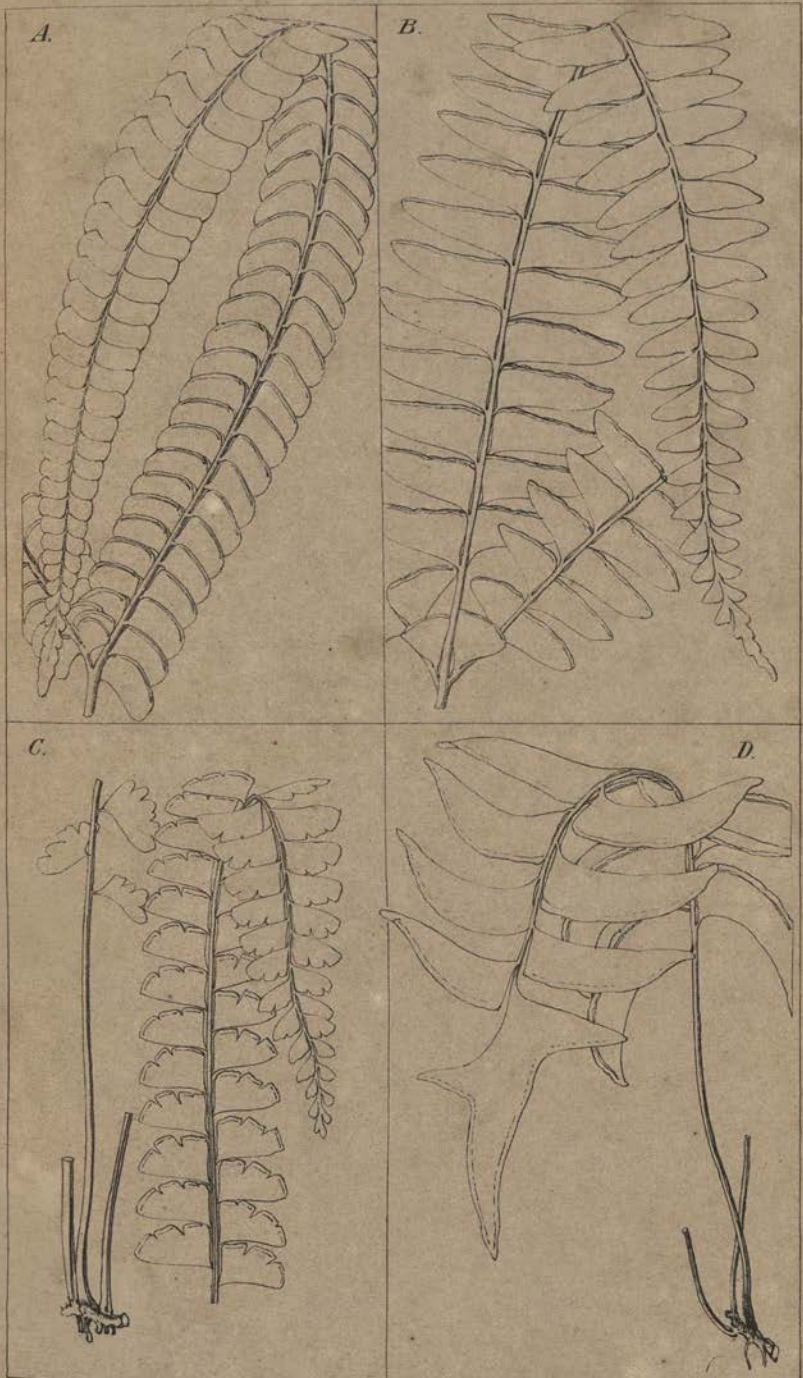
TAB. LXII.

A. LINDSÆA GUIANENSIS, *Dry.*—p. 216.
Portion of a plant, *nat. size.*

B. LINDSÆA HORIZONTALIS, *Hook.*—p. 214.
Portion of a plant, *nat. size.*

C. LINDSÆA LOBBIANA, *Hook.*—p. 205.
Upper and lower portion of a plant, *nat. size.*

D. LINDSÆA LEPRIEURII, *Hook.*—p. 208.
Plant, *nat size.*


A.
B.
C.
D.

TAB. LXIII.

A. LINDSÆA RIGIDA, *J. Sm.*—p. 217.
Portion of a plant, *nat. size.*

B. LINDSÆA SCANDENS, *Hook.*—p. 205.
Portion of a plant, *nat. size.*

C. LINDSÆA FLABELLULATA, *γ. Hook.*—p. 211.
Portion of a plant, *nat. size.*

D. LINDSÆA FILIFORMIS, *Hook.*—p. 212.
Portion of a plant, *nat. size.* Fig. 1. Fertile pinnæ, *magnified.*

A.
B.
C.
D
1

Tab. LXIV.

A. Lindsæa ovata, *J. Sm.*—p. 204.
Plant, *nat. size.* Fig. 1. Fertile pinnule, *magnified.*

B. Lindsæa falciformis, *Hook.*—p. 208.
Plant, *nat. size.* Fig. 1. Fertile pinnule, *magnified.*

C. Lindsæa dubia, *Spr.*—p. 209.
Plant, *nat. size.* Fig. 1. Fertile pinnule, *magnified.*

A
1
B
1
C
1

Tab. LXV.

A. Lindsæa pendula, *Kl.*—p. 213.
Upper and lower portion of a plant, *nat. size.* Fig. 1. Fertile pinnules, *magnified.*

B. Lindsæa Catharinæ, *Hook.*—p. 212.
Portion of a plant, *nat. size.* Fig. 1. Fertile pinnæ, *magnified.*

C. Lindsæa Gardneri, *Hook.*—p. 213.
Portion of a plant, *nat. size.* Fig. 1. Fertile pinnule, *magnified.*

A
1
+
+
B
1
C
1

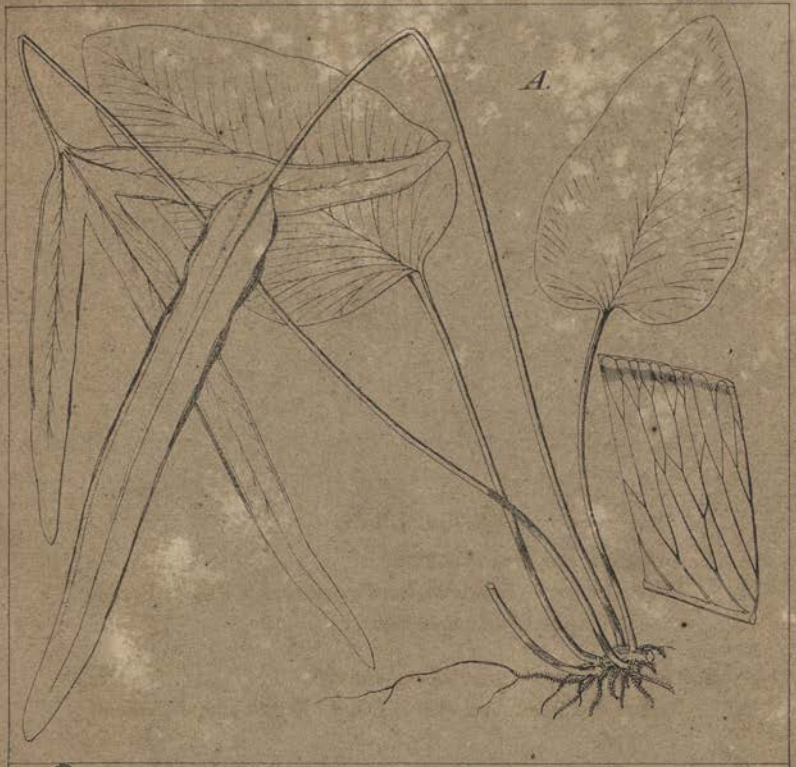
Tab. LXVI.

A. Lindsæa cordata,—p. 219.

Plant with sterile and fertile fronds, *nat. size.* Fig. 1. Portion of a sterile frond, *magnified.*

B. Lindsæa propinqua. *Hook.*—p. 223.

Portion of a frond, *nat. size.* Fig. 1. Fertile pinnule, *magnified.*


A.

B.
1

Tab. LXVII.

A. Lindsæa pentaphylla, *Hook.*—p. 219.
Sterile and fertile fronds, *nat. size.*

B. Lindsæa intermedia, *Hook.*—p. 222.
Fertile fronds, *nat. size.*

A.

B.

Tab. LXVIII.

A. Lindsæa davallioides, *Bl.*—p. 224.
Portion of stipes and frond, *nat. size.* Fig. 1. Fertile pinnule, *magnified.*

B. Lindsæa Griffithiana, *Hook.*—p. 219.
Fronds, *nat. size.* Fig. 1. Portion of the fertile frond, *magnified.*

A.
1
B.
1

Tab. LXIX.

A. Lindsæa Walkeræ, *Hook.*—p. 209.

Plant, *nat. size.* Fig. 1. Portion of a fertile pinna, *magnified.*

B. Lindsæa lanuginosa, *Wall.*—p. 210.

Fig. 1. Lower and sterile portion of a frond, *nat. size*; with a portion of a pinna, *magnified.* Fig. 2. Upper and fertile portion of a frond, *nat. size*; with a portion of a pinna, *magnified.*

A
B.
2
1
1

TAB. LXX.

A. LINDSÆA RECURVATA, *Wall.*—p. 222.
Plant, *nat. size.* Fig. 1. Fertile pinna, *magnified.*

B. LINDSÆA FRASERI,—*Hook.* p. 221.
Plant, *nat. size.* Fig. 1. Fertile pinna, *magnified.*

A
B
1
1

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